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An Educational Journal of Neuropsychiatry, founded in 1874

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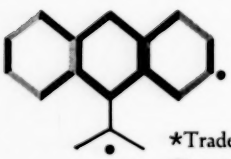

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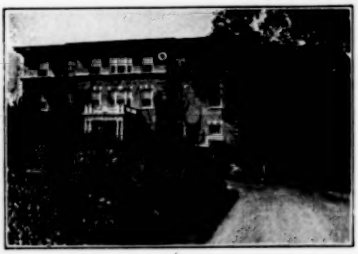

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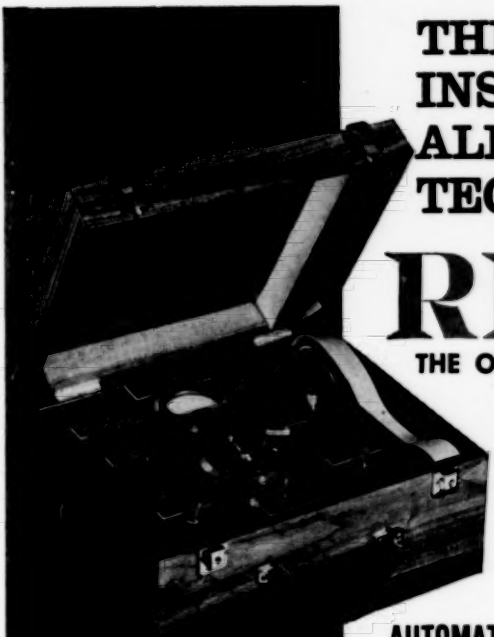

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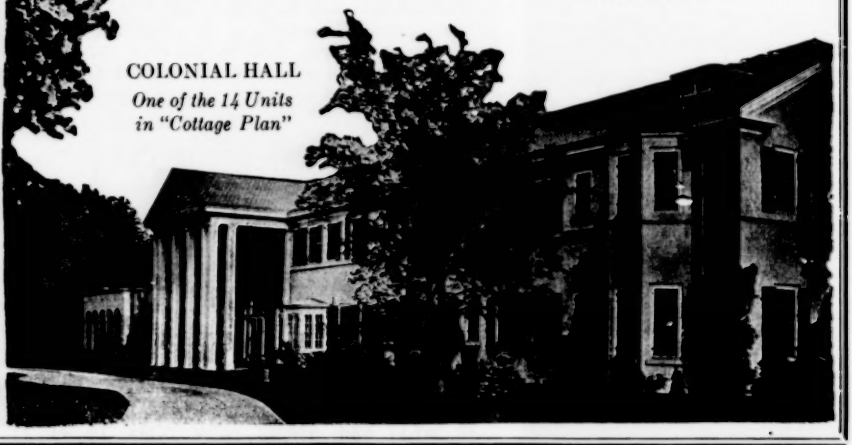

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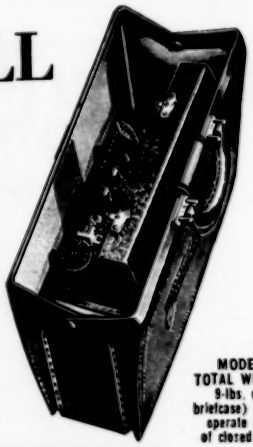

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PSYCHOSOMATIC CONSIDERATIONS OF DIABETES IN CHILDHOOD[1]

PHILLIP H. STARR, M.D.[2]

Introduction

Consequent upon the phenomenal advances achieved in the field of medicine over the past few decades, the focus of clinical concern and investigation has shifted from that of the reduction of mortality to that of the lessening of morbidity. The progressive refinement of medical care has alerted us to and underlined the existence of a psychological as well as physical aspect to morbidity. Such a dual approach to the patient has been characteristically and somewhat popularly referred to as the psychosomatic concept. The ironic overstatement somewhat unjustly applied to the surgeon, namely that "the operation was a success but the patient died," can be equally applied to those practitioners interested in diabetic care in the somewhat changed following form, "the diabetes was successfully regulated but the patient decompensated emotionally".

This changing trend in medicine is witnessed in bold relief when we subject the historical unfolding of the slowly achieved metabolic mastery over the clinical disease, diabetes mellitus, to such an analysis. During the pre-insulin era, the central objective confronting the physician was quite simply that of the patient's survival. However, within a short period of time following the crucial isolation of insulin (the insulin era), medical investigators became rather exclusively preoccupied with increasingly successful attempts at reducing the physical aspects of diabetic morbidity. The 1940's heralded a third era in the clinical management of diabetes. Tolstoi (11) was one of the first proponents who discarded the premise that sugar-free urine was necessarily the desired objective in the treatment of diabetes; his introduction of a free-diet program, although felt by most experts in the field to be too radical a departure, represented the first swing of the pendulum away from metabolic perfectionism towards that of greater dietary liberalism. He postulated two major benefits of his diabetic program; firstly, that the appearance of minimal glycosuria in the diabetic was conceivably more advantageous to the body from a purely metabolic standpoint and, secondly, most patients were more able to tolerate the exigencies of the detailed diabetic program where some such dietary leeway was offered them. Children, especially, who may have previously protested against their diabetic state, felt that "the edge had been taken off their disability." This psychosomatic era gained further impetus as a result of additional clinical experiences and observations. A segment of diabetic children defied consistent regulation in spite of the pediatrician's increased armamentarium of metabolic, endocrine and neurophysiological understanding. Every pediatrician working with diabetics has undergone such a frustrating experience. Most of these children could have diabetically stabilized had they not been subject to both emotional instability and parental instability. This hitherto unrecognized enemy, in the form of psychological complications of physical disease, reared its unwelcome head and had to be dealt with as another agent which faced the pediatrician with the possibility of clinical defeat. Clinical efforts at successful diabetic management in several poorly regulated diabetics had now to contend with their irrational attitudes towards their disease, their parents, and their physician. We were therefore brought

[1] Presented in part at the M. & R. Pediatric Research Conference, St. Louis, 1954.

[2] Director, Community Child Guidance Clinic of Washington University, St. Louis. Assistant Professor of Neuropsychiatry and Pediatrics.

face to face with a new dimension in the care of clinical diabetes, seen most starkly in that infamous segment of patients who may be characterized by the oversimplified remark that "they just won't cooperate."

Furthermore, if the clinician chose to look somewhat more closely, he became alerted to several patients whose diabetes was well regulated but whose lives were not. Emotional invalidism was seen to exist in spite of the most adequate metabolic care. In the pre-insulin era it was quite an impractical consideration for the physician to be concerned with the emotional health of his diabetic when he was attempting to stem the death-dealing effects of unregulated diabetes. At this late date, however, the feeling of emotional well-being is no longer considered to be a clinical luxury but instead is part and parcel of the pediatrician's responsibility in his lessening of diabetic morbidity. The total welfare of the patient who is subject to a diabetic illness has become our primary objective; anything less than this is no longer an acceptable medical goal.

A Classification of Psychosomatic Reactions and Its Application to Juvenile Diabetes

What is this hazy "No Man's Land" of medicine where physical and psychological factors interlock and make for difficult diagnostic and therapeutic problems? Every physical illness involves some type of psychological reaction and conversely many somatic complaints originate on the basis of psychologically determined anxiety. This interrelationship of psychiatric and somatic factors in the clinical illness of any one patient is a most problematic area which has been receiving much emphasis and study. The consequence of such sustained investigation has been the development of the so-called psychosomatic concept of disease. Instead of choosing to discard "this problem child of medicine" we may more optimistically react to this challenge by an attempt to dissect, analyze and chart the conglomeration of syndromes and reactions that go under the name of "psychosomatic disorders." Unfortunately this concept has become a catch-all category in which a host of varied clinical states have sought refuge. Perhaps it would be wisest for us to first recognize some general perspectives of this field before undertaking a more specific discussion of the psychological aspects of diabetes in children. In the past, nosological systems (3) have used a classification according to organ systems but their value has been recognized as limited. These have not provided for the possibility of etiological differentiation. We will attempt to enlarge on a new method of diagnostic categorization in part suggested by some of the recent work of Margolin (6) and Alexander (1).

The psychiatric consultant working within a children's hospital is routinely requested to assess the nature of certain somatic complaints and disorders as well as pseudo-somatic complaints and disorders which seem to exist in the absence of demonstrable structural pathology or co-exist in the presence of concrete physical disease. Let us attempt, therefore, to follow the differential diagnostic reasoning of such a consultant whose opinion is sought for the investigation of *the form, extent and quality of the psychogenic component* as it exists within the total symptom-complex that the patient presents to us for clinical decipherment. To begin with, the psychological aspect of any one illness may range from that of incidental to that of central importance. It may, therefore, be helpful to configurate a spectrum of psychosomatic disorders which demonstrates a complete range of psychiatric complications as they may variably occur in all types of clinical illness (table 1).

Table 1 points up the four major sets of interrelated somatic and psychological states of dysfunction and some common examples of each. *It should be stressed, however, that any one patient with a clinical disorder will be found to be subject to one or more of the above reactions which may be operating simultaneously or in sequence.* We will later attempt to demonstrate this spectrum of psychosomatic reactions in connection with our appraisal of the psychological factors in juvenile diabetes. Hopefully, such an approach will allow us to take *a psychosomatic inventory* to aid us with our differential diagnosis as well as with the goal of comprehensive therapeutics.

Let us discuss each of these four categories in turn for the purposes of definition and elucidation:

The Psychological "Pseudo-Somatic"[3] *Reactions*

This group encompasses the more classical types of disorders met with in psychiatric prac-

[3] The term "pseudo-somatic" is used for want of

TABLE 1.—THE PSYCHOSOMATIC SPECTRUM
(A representation of the major psychosomatic correlations)

Nature of the psychosomatic reaction	Psychological pseudosomatic reactions	Psychophysiological reactions	Psychopathophysiological reactions	Somatopsychological reactions
The symptom, syndrome or disease commonly exemplifying such reactions	Conversion hysteria Somatic obsession Somatic compulsion Hypochondriasis Somatic delusion, etc.	Anxiety states Tachycardia Hyperventilation Dyspnea Diarrhea Diaphoresis, etc.	Peptic ulcer Bronchial asthma Hypertension Thyrotoxicosis Diabetes mellitus Epilepsy Neurodermatitis, etc.	Rheumatic fever Tuberculosis Encephalitis Cerebral palsy, etc.
Causal connections between the psychological factor and the somatic manifestation	Psychological factor is:	Causative of ← Precipitating of ← Exacerbating of ← Perpetuating of ← Incidental to → The somatic manifestations		
Value of psychotherapeutic intervention in reversing the somatic or pseudosomatic manifestations		Maximal ("curative") ← Modifying → Minimal (ameliorative)		
The psychic-somatic ratio: the degree and extent of the psychological component in the somatic or pseudosomatic manifestations		P/S = >1 ← P/S = 1 → P/S = <1 (P = psychic; S = somatic)		

tice. These are psychological states existing in relatively "pure culture," wherein there is *no demonstrable* physiological dysfunction or patho-structural change in the presence of the somatic complaints. Clinical investigations usually uncover emotional conflicts which often explain the basis for the somatic complaints. Psychological pseudo-somatic reactions can be essentially regarded as specific superficial manifestations of a disturbed emotional state which may otherwise not be in evidence. The most common clinical examples of such reactions include: conversion hysteria, somatic obsessions, somatic compulsions, hypochondriasis, somatic delusions.

The Psycho-Physiological Reactions

In Cannon's pioneering experimentation with the "fight-flight phenomena" he demonstrated a close correlation between emotional states and the concomitant physiological changes reflected in such manifestations as tachycardia and hyperpnea. We have come to recognize that accompanying a host of affective disturbances (e.g. fright, guilt, panic, depression), there are simultaneous and harmonious fluctuations in body physiology inclusive of the endocrine, metabolic and neurophysiological mechanisms. Such alterations in the biological economy have often been referred to as anxiety or affect equivalents. Ferenczi (4), in referring to these phenomena, has used the phrase "somatization of anxiety."

More recently, and largely as a result of Seyle's encompassing work on his so-called general adaptation syndrome, the psychophysiological manifestations of emotional stress have gained a much wider acceptance in the field of medicine. Numerous investigators have attempted to documentarily show valid connections between emotional and physiological dysfunction by the use of detailed laboratory data and concomitant psychological studies. Emotional disturbance as a "stress agent" will create neurophysiological, metabolic and endocrine changes which are strikingly similar to those stress situations created by physical or biological agents. It

better nomenclature. As emphasized by Freud, it is quite conceivable that further exhaustive research may point up underlying biological mechanisms which would explain the genesis of these reactions.

may be helpful to quote Seyle (6) directly: "psychogenic stimuli are potent activators of the adrenocorticotrophic function and produce rapid and intense alarm reactions. The coexistence of disordered endocrine mechanisms with disturbed emotional states has been well recognized although the precise nature of this relationship remains unclear. (The pituitary-adrenal system would appear to be the main regulator of the adaptive processes.)"

The clinical syndrome which most conclusively points up psycho-physiological reactions is the anxiety state. Essentially this is a state of temporary emotional, neurophysiological, metabolic and endocrine imbalance. The physiological alterations most frequently noted in this state include tachycardia, hyperpnea, diaphoresis, tremor and pallor.

Psycho-Pathophysiological Reactions

Margolin (6) has emphasized that the psycho-physiological reactions described above are in essence functional and reversible disturbances. However, when such physiological manifestations become long-acting and frequent in their occurrence, "the second phase may be the establishment of fixed tissue changes during this phase, the mechanisms of the previous functional phase often continue but may be obscured or distorted by the systemic reactions to them, such as fever, anorexia and loss of weight it should be emphasized that the two phases (psycho-physiological and psycho-pathophysiological) differ in symptoms, pathophysiology, clinical signs, diagnosis, prognosis and therapy."

In referring to psycho-pathophysiological reactions *we imply that the psychological forces may etiologically precipitate, exacerbate and/or perpetuate the structural changes that may have appeared in any one organ.* Although it has been mentioned that such psycho-pathophysiological reactions may arise from relatively sustained, chronic and repeated psycho-physiological reactions, the latter need not necessarily be the central determining factor in the origin of the structural change. Any other stress factor, such as a thermal, nutritional, allergic or infectious insult, may have been of primary significance in the original determination of the disease onset.

Within this set of psychosomatic reactions the following partial listing may be made: hypertension, duodenal ulcer, mucous colitis, ulcerative colitis, bronchial asthma, thyrotoxicosis, diabetes mellitus, epilepsy, neurodermatitis, etc.

Somato-Psychological Reactions

Pediatricians by and large are more familiar with this particular group of psychosomatic reactions. Within this set of psychosomatic states, we recognize that the actual onset of the somatic disease creates and triggers an emotional disequilibrium so that psychiatric symptoms appear on the scene as secondary and incidental to the physical disorder. In essence, psychological invalidism follows close on the heels of physical invalidism.

By and large four major somato-psychological sub-reactions can be recognized and included within this category:

Mobilization of a latent psychiatric disorder. The stress of the physical illness on the emotional economy of the individual creates or precipitates the latent psychiatric disorder which was non-evident prior to the occurrence of the physical illness. E.g.: an acute or chronic physical disease may bring to the fore previously unrecognized potentials for psychiatric illness including neurosis, depression, and schizophrenia.

Circumscribed psychological reactions to the specific manifestations of the physical disease as well as to the change in the way of life dictated by the disease. E.g.: psychological repercussion may occur in relationship to the sensitivities that are existent in connection with such physical defects as amputation, paralysis, etc. In addition, the limitations in activity that are made necessary—in the cardiac, for instance—may adversely affect the patient's emotional health.

Cerebral disease with concomitant brain cell changes occurring as a consequence of toxic, inflammatory, neoplastic, degenerative and traumatic processes will give rise to a host of psychological disturbances. Depending on the site of the lesion, psychological and intellectual deficits will often accompany neurological deficits.

The phenomena of secondary gain and/or secondary elaboration. After the patho-structural basis for certain symptoms has left, the symptoms or complaints remain on unchanged.

In some cases the patient may neurotically exploit his environment for certain gains by unconsciously refusing to give up his symptoms, or he may use such symptoms to express underlying interpersonal attitudes indirectly and more subtly. E.g.: a cough persists in spite of the fact that the original infective basis of the symptom has cleared: in such a case the child may have enjoyed the maternal solicitude that appeared as a result of his cough. In another boy, for example, the cough may be used as an irritating agent to keep his parents awake.

. . . . .

It has been mentioned that in any one juvenile diabetic the psychic component may conceivably vary from incidental to primary importance both in the etiology and in course of the disease. We will attempt to apply the psychosomatic inventory just configurated to our study of diabetes in children and in most cases give brief clinical excerpts of those children who demonstrate the different types of psychosomatic reactions. Although in several instances a different child is chosen to exemplify one of the variable psychosomatic reactions, it is to be re-emphasized that any one diabetic child may demonstrate one or more of these reactions simultaneously or in temporal sequence.

In the author's clinical investigations of the several diabetic children presented in this paper, he has relied on historical data and direct clinical observations in his arrival at diagnostic impressions. Only brief and pertinent excerpts of these case studies will be presented.

Psychological Pseudo-Somatic Reactions in Children Simulating Diabetes Mellitus

The classical clinical signs and symptoms heralding the appearance of diabetes mellitus include the triad of polydipsia, polyphagia and polyuria. From time to time one or more of these symptoms may appear in a child where their underlying causation is not diabetic disease, but an underlying and otherwise unexpressed emotional disturbance.

Case 1.[4] T. W.—A boy with a conversion-hysterical disorder simulating diabetes mellitus. This quiet, apprehensive and somewhat timid youngster of seven was admitted for study with the particular intent of ruling out diabetes mellitus or diabetes insipidus. For the past three years he had been drinking close to five times the daily average water consumption, as a result of an intractable thirst. Polyuria was simultaneously present. Accompanying this symptom, marked familial disagreement revolving around this boy's management had arisen. The very intensive metabolic and endocrinologic investigation did not reveal a pituitary or pancreatic dyscrasia or any other organic structural basis for his presenting symptom.

A detailed history revealed that a central feeding problem appeared as the major conflictual area in Tommy's clinical syndrome. During the first two months of his life he was exclusively breast fed, after which time he was supplemented with formula feedings. Except for a transient period of abdominal colic he did well on the breast and subsequently on the bottle until the age of 7 months. At this point an abrupt weaning occurred, followed by a very vigorous and persistent thumb-sucking which after a period of time reduced itself in intensity but was never completely relinquished until he was four years of age.

Mrs. W. described herself as a somewhat oversolicitous and an unnecessarily alarmed mother who, for example, would become excessively concerned about minor infections and minimal weight gain in her boy. With this as a background her husband, who had been away in the service, returned when the boy was approximately 18 months of age. Almost from the period of his entry into the household, and continuing for a period of many months, there was a marked reduction in the boy's total solid food intake. In spite of his maintaining a fairly good weight, Mrs. W. became quite concerned and set about relieving her anxieties by stepping up his fluid (milk) intake while he continued to eat very few solids. At the age of 3, this trend was reinforced as a consequence of the appearance of an acute tonsillitis with high temperature, when the medical recommendations included "the pushing of fluids."

Mr. W. was a markedly possessive husband, who had been quite intolerant of allowing his wife to establish close and significant relationships with other family members and friends. This jealousy had been openly displayed in connection with his wife's relationship with her mother; it was more veiled and subtly evidenced in his reactions to the overly close tie that existed between his wife and son, who had been born when the father was away in service. Most of the marital conflict began to revolve around the parental differences in the management of Tommy's fluid consumption. Mrs. W. explained, "My husband usually tries to force our boy to eat solids and discontinue fluids by the use of threats. I am much more lenient and will allow him to take milk or water if he asks for it long enough."

Our psychodiagnostic impressions indicated that water came to represent something that his father prohibited (after a time, Tommy stole water) and at the same time something in which his mother indulged him. Thus as a prototype it represented the boy's attempt to preserve the fluid-feeding relationship

[4] The author would like to express his thanks to editors of the *Nervous Child* for their given permission in the re-publication of this case.

between himself and the mother which existed prior to the father's entrance into the home. The intense possessive tendencies involving the exclusive ownership of the mother were in evidence in both father and son, and resulted in head-on disagreement. This problem was, however, masked by a presenting symptom of polydipsia, so that the struggle between father and son was displaced from the mother as the object to the consumption of water.

Psycho-Physiological Reactions in Juvenile Diabetes

In the course of diabetic management, reactions that suggest hypoglycemic states frequently call for an accurate clinical assessment. Musser and his group (7) have recently emphasized the clinically indistinguishable manifestations in the diabetic patient who is subject to anxiety states (including the hyperventilation syndrome) from the diabetic with a true insulin reaction. Several such researchers have pointed to this lack of uniformity between the clinical manifestations of such hypoglycemic-like reactions and the blood glucose level. Where such clinical signs (such as dizziness, weakness, fatigue, palpitation, sweating, tremor, headache etc.) occur in the presence of normoglycemia or hyperglycemia, reference is made to a pseudo-hypoglycemic state that remains unrelieved by simple alterations in diet and insulin dosage. Instead such pseudo-hypoglycemic states can only be altered as a result of psychotherapeutic intervention aimed at the alleviation of excessive anxiety.

Case 2. N. A.—A boy with simulated hypoglycemic reactions (psycho-physiological manifestations of unexpressed rage). During his third hospital admission for unregulated diabetes, this boy became a serious ward management problem. He was both defiant and provoking of the hospital personnel. On several different occasions when approached he would complain of headache, sleepiness and general fatigue. When interviewed privately he gave a rather frank account of his unhappy state and proceeded to give the following verbatim description of his tendency to suppress his rage. "When they make me angry, I don't show it immediately; instead I usually wait until I'm ready to explode. At this time I get hot inside, headachy, then weak and tired all over and I have to lie down in bed. That's what happened the other evening when the nurse wouldn't get me that drink." On one occasion the above symptoms were completely relieved by the inadvertent administration of *sucrose* intravenously.

Psycho-Pathophysiological Reactions in Juvenile Diabetes

The almost indiscernible merging between psycho-physiological reactions and psycho-pathophysiological reactions will be recognized if one attempts to carefully differentiate these two reaction types. It would seem that in order to be most clinically accurate, these two reactions are to be looked upon as part of one continuum.

The appearance of hypoglycemia as well as hyperglycemia as a consequence of emotional stress in diabetic patients has been reported by several investigators, notably Daniels (2) and Hinkle (5). Hinkle has executed the most carefully designed and exhaustive studies aimed at directly correlating the fluctuation in the diabetic's metabolism with concrete emotional disturbances. His investigations would appear to have conclusively demonstrated that stimuli arising out of adverse life experiences produce in both diabetic and non-diabetic humans a rise of the ketone bodies in the venous blood and clinically significant fluctuations in blood sugar. His findings indicated that, in several diabetics where the emotional stress persisted, demonstrable ketosis and hyperglycemia appeared in some while hypoglycemia became evident in others. The other variables affecting diabetic regulation inclusive of infections, changes in the extent of physical activity, alterations in insulin and of food intake were well controlled in his experimentations.

Case 3. P. G.—Marked fluctuations in the level of glycosuria which appeared to be harmoniously related to disturbed emotional states in a 14-year-old. Mrs. G., an unusually reliable informant, indicated that her son, now 14, still depended somewhat excessively on her for insulin administration and the execution of the urinalysis. In one of our interviews the mother, who very conscientiously kept the home charts, reported that she had always been alerted to a direct correlation between the boy's emotional fluctuations on the one hand and the sudden changes in the sugar content of his urine. Such phenomena as an anticipated school test, a crying episode following a disciplinary skirmish with his father, an exciting movie or basketball game, quite invariably were followed by a marked increase in glycosuria.

In a review of the pertinent literature, one runs across detailed psychological case studies where the original onset of the diabetes appears to be closely and temporally correlated with a major disturbing event in the patient's life situation. None of these investigations can be said to be conclusive, as the opportunity for laboratory confirmation of such a correlation is rarely offered to an investigator. On the other hand, the evidence appears much more

concrete that patients who experience frequent hospital admissions for acidosis are quite frequently the victims of a serious emotional instability. Psychological upheavals often trigger and predispose the patient towards states of diabetic acidosis. Rosen and Lidz (9) have postulated that many of these patients who show a notoriously repetitive tendency to develop acidosis quite frequently attempt to flee their life situation and find protective refuge in a hospital. They further point to the possibility that in many depressed diabetics such a phenomenon may actually be representative of a suicidal gesture.

Case 4. W. H.—A boy in whom both the onset of his diabetes as well as the exacerbations of diabetic acidosis could be temporally correlated with antecedent and concurrent major life crises. Willie was admitted to the ward in a moderately advanced state of diabetic acidosis. Although 12 years of age, his physical growth and development was more in keeping with a child chronologically four years his junior. His wizened, undernourished appearance seemed to accentuate his look of desperation, which showed through in the form of a saddened and apathetic facies. With mutilating effect he kept picking away at his impetigo so that it resulted in facial disfigurement.

The boy's family background was somewhat equally deplorable. The sociocultural setting of this Ozarkian family pointed to a marginal type of life existence replete with such factors as limited education, large numbers of children, a relative acceptance of life-long poverty with insufficient amounts of food and a curious resistance towards change. Mrs. H. appeared as a worn, somewhat dazed individual whose many household responsibilities and unending pregnancies kept her as a resigned captive within her home situation.

Willie, according to the mother, had started out as an outgoing, frisky infant, but within 6 months after his birth, he changed into an irritable, cranky and apparently dissatisfied little creature. This seemed to be temporally related to the mother's decreasing interest in the boy largely as a result of her new pregnancy. The infant could not be weaned from his thumb, which he chose to keep in his mouth until he was 5½ years of age. With this relative emotional loss of his mother, the boy sought out a substitute in the form of his maternal grandfather as well as his father. But these relationships were not enough and he seemed to be subject to states of intense unhappiness and loneliness which would temporarily dissipate whenever these two men appeared on the scene. At other times however he was quite resigned to brooding and would intermittently speak quite openly about his wish to die. There were two actual abortive suicidal attempts. The loss of Willie's grandfather was a very devastating blow which the boy reacted to with a rather alarming anorexia. Within a few months of this crisis, the boy was admitted into the Children's Hospital with a diagnosis of diabetes mellitus.

As time went on, however, he seemed to readjust somewhat, and turned quite heavily towards his father who did provide him with a rather sparse but at the same time a warm relationship. The marital situation deteriorated rapidly and Mr. H. somewhat unexpectedly deserted the home in order to live with another woman. This event occurred one month before the boy's diabetes showed indications of excessively poor regulation. His hospital admission resulted as a consequence of his diabetic acidosis which appeared on the heels of this upset. The boy spoke of himself as being incurable and hopelessly ill.

Somato-Psychological Reactions in Diabetic Children

Precipitation of a Latent Psychiatric Disturbance by the Onset of Diabetes Mellitus. In case 4, described above, a markedly severe depressive reaction followed the onset of diabetes, although significant indications of such a predisposition were in evidence before this added complication in his life appeared. In case 2 there were noticeably exaggerated paranoid tendencies, which were mobilized after the onset of his diabetes mellitus.

Circumscribed Psychological Reactions to the Specific Manifestations of Diabetes Mellitus as Well as to the Change in the Way of Life Dictated by the Disease. Many children react to their illness with feelings of inferiority and a self-concept of having a damaged body. They will often develop serious sensitivities about being different from other children by virtue of requiring special diets, insulin administration, etc.

Cerebral Damage in a Diabetic Child Giving Rise to Host of Psychological Disturbances. In the face of unavailable literature, the author at best can only be scientifically speculative about this category. It is conceivable that sustained, severe and repetitive episodes of insulin reactions and/or diabetic acidosis could lead to cerebral damage with its consequent manifestations in the form of neurological, psychological and intellectual deficit.

The Phenomena of Secondary Gain in Diabetic Children. One girl was mercilessly exploiting her mother whose defenselessness against the child's demands arose as a consequence of her irrational conviction that she had been the cause of the child's diabetes.

The More Common Psychological Problems in the Management of Juvenile Diabetes

To add to our complexities in the pediatric management of diabetes, we are compelled to

consider the mother as an added and necessary dimension to be coped with in the successful metabolic and emotional regulation of the diabetic child. To be sure, one has to make due allowances for this "maternal factor" in every aspect of the pediatrician's comprehensive approach to child care and disease. It becomes quite essential that the mother assume the helpful role of "the auxiliary physician." However, where the mother-child relationship is disordered, the child's adverse attitudes towards the mother become secondarily complicated by unhealthy attitudes towards his disease. In similar fashion, the mother's pathological attitudes towards the child will reflect themselves in the form of inopportune and detrimental modes of handling her child's diabetic disease. It can be said that unless the mother-child, the physician-mother and the physician-child relationships are largely harmonious and conflict-free, complications will inevitably arise in the instrumentation of otherwise beneficial pediatric recommendations.

The mother's crucial role in the child's physical and psychological welfare can be seen most dramatically in the early nature of the closed extra-uterine psychophysiological unit (10) that exists during the first year of the primarily feeding relationship in the mother-infant system. As the infant moves through childhood and towards adolescence, this close and symbiotic interaction becomes quite diluted so that our child becomes increasingly self-sufficient and autonomous. However, where complications (either physical or psychological) arise, this interpersonal weaning is never conclusively achieved. It can be readily appreciated that the appearance of diabetes in a child with its quite natural heavy reliance on the mother for the correct administration of diet and insulin (responsibilities which age-inadequate children cannot assume) tends to decelerate this psychological disengagement. Some mothers may exploit and intensify this overdependent trend in their diabetic child while others may attempt to escape from this increased reliance on the part of the child. The common result is a child whose emotional self-reliance and confidence is undermined. As a consequence, in several such families the diabetic child will undergo a psychological stagnation and his achievement of psychic maturation never fully materializes.

There is much clinical validity contained in the humorous comment often made during the routine course of pediatric practice, namely that "you have to treat the mother rather than the child." In many such situations, where this maternal factor is not given serious and duly warranted consideration, complications in diabetic management soon appear.

Generally speaking, we can quite accurately predict the nature of the family's and the child's adjustment to the sudden appearance of juvenile diabetes. *This prediction is made possible by a careful and concrete evaluation of the pre-diabetic emotional state of affairs within the child and his family.* Given the same degree of life stress (i.e., the appearance of diabetes), the child and his family will react varyingly to such an emotional trauma. Where the intrafamilial adjustment has been adequately successful, the diabetic illness will ultimately (after a short period of reactive disturbance) be taken "in their stride"; but, on the other hand, where faulty interpersonal relationships and extensive conflicts were quite prevalent, one can assume that the diabetes will result in reverberating emotional repercussions. To put it succinctly, emotional decompensation occurs much more easily where damage already exists.

The most interesting and crucially significant phenomenon to be recognized in such poorly adjusted family situations is the fact that the diabetic management per se becomes the arena and battleground for the expression of irrational pre-existing attitudes in the mother-child system. Before the diabetes appeared on the scene there were other interpersonal avenues for the expression of such problems. This emotional contamination of the various details of diabetic regulation (such as the restriction of diet, the restriction of activity, the administration of insulin, execution of the urinalysis, etc.) makes for a myriad of complicating possibilities in an otherwise easily regulated diabetic child. The family's individualized reactions towards the child and his diabetes is of central importance in determining the type and specific nature of the adverse adjustment the child will make in connection with his illness.

At this juncture, the more common varia-

tions of pathological parental attitudes leading to psychopathological complications within the child and in his attitudes towards his diabetes will be highlighted:

The Overly Anxious and Danger-Alerted Parental Patterns

Within such an atmosphere, the child is vigilantly watched and warned about the multiple possibilities of danger and bodily damage which could result from relatively minor and innocuous transgressions from diabetic routine (some increase in activity, minimal dietary changes, etc.). For the child, the preservation of his life becomes possible only if he steels himself against and anticipates such eternal dangers. At all times he is in a state of "adrenalin preparedness" and fight-or-flight readiness.

Such a child becomes flooded with intense anxiety and repeatedly subject to psychophysiological reactions (anxiety states). Within the setting of such an artificially induced predicament, the child may react in one or more of the following ways: increased bodily concern resulting in psychological invalidism, increased dependency on his parents because he needs their potential support in walking "the thin tight-rope of diabetic safety" or defiance aimed at temporarily escaping such an untenable position which is overly fraught with danger.

The Overly Indulgent, Overly Permissive and Excessively Dedicated Parental Patterns

Such parents are unfortunately laboring under an excessive amount of unfounded guilt which usually originates on the basis of their self-blame for the diabetes in their child. The institution of moderate limitations in the regulation of the child's diabetes is achieved by them only with great difficulty; these parents cannot say "no" to any of the demands or requests that are made of them by the child.

In short order, the child becomes aware of their emotional "Achilles heel" and quite frequently exploits the existing parental guilt in order to obtain a free license for the exercisement of their every whim. This sense of self-blame in the parent is often re-inforced by an equally unfounded inner conviction on the part of the child that the parents are to be held legitimately responsible for his disability.

Controlling, Punitive, Withholding and Overly Perfectionistic Parental Patterns

From time to time parents are observed whose exclusive and only objective is to achieve a metabolically perfect diabetic regulation in their child. Such an aim is achieved at all cost, which may include the complete submergence of the individuality of the child. On the other hand, once achieved, they are often quite dissatisfied with the mechanically regulated "diabetic robot" that results as an end product of their unrelenting attitudes. Such a child is never allowed to forget that he is a diabetic and his life becomes a ritual largely revolving around the various details of his diabetic management. We witness the development on an overly regulated, compulsive, emotionally vacuous personality, most unlike the healthy child whose diabetes is of marginal rather than of central importance in determining his way of life. Not all of these children submit to such a tyrannical overcontrol, for quite frequently we see a child who is essentially provoked into an open rebellion against his parents and unfortunately against his diabetes.

The Disinterested, Delinquent, Egocentric and Grossly Neglectful Parental Patterns

Where such parental tendencies prevail, children are usually reacted to as unwelcome burdens who limit the attractive and inviting possibilities of leading irresponsible lives primarily aimed exclusively at self-satisfaction. Such parents have very little manifest capacity for parenthood. The arrival of diabetes, with the increasing demands for child care that this poses for the parent, creates more negative and resentful attitudes towards the child. These parents are usually pre-occupied with ruminations which involve wishes for escape from their family living, which they react to as burdensome. In several families (see case 3), adverse socio-economic factors may create a somewhat more realistic basis for the relative intolerance in the parents of the additional load that the diabetes in their child imposes. Children react most commonly to such situations with either depressive, delinquent or rebellious attitudes.

It is perhaps well to emphasize, at this point, that the above sets of pathological parental attitudes do not necessarily occur in pure cul-

ture. For example, some parents may vacillate from an overly permissive to an overly controlling method of handling their child and his diabetes. Nevertheless our experiences have indicated that predominantly such parents fall into one or another category as outlined above. Further, at the risk of being repetitious, it is to be underlined that in most cases such pathological attitudes were in evidence prediabetically. The diabetic disease, operating as an added emotional stress, brings such disturbed relationships more sharply into focus and the details of the diabetic routine become secondarily contaminated with such complicating attitudes. It should also be stressed that, in somewhat more diluted fashion, the physician in the pursuit of his medical (and parentlike) responsibility to the child will often be emotionally categorized by such a child as representing one or another of the above parental types. The consequences are a disturbed physician-child relationship, with consequent complications in the diabetic regulation.

A review of the above parental and maternal types will indicate that the more commonly met forms of psychopathological reactions in the child in connection with his diabetes will include the following:

1. The excessively anxious and endangered (paranoid) personality.
2. The compulsive, overly-regulated and regimented personality.
3. The depressive and self-destructive personality.
4. The delinquent and rebellious personality.
5. The submissive, passive and excessively dependent personality.

Such a variety of personality problems in the child require different psychotherapeutic techniques and objectives for their adequate resolution.

Psychotherapeutic Aspects in the Management of the Diabetic Child and His Family

General Psychotherapeutic Perspectives

An adequate psychotherapeutic program can be arrived at only after an accurate diagnostic appraisal has been made. Within the total constellation of the patient's illness, it becomes crucial that we assess the specific nature of the interrelationship between the psychological and somatic factors as it may exist in any one diabetic who is subject to some emotional disequilibrium The arrival at general psychotherapeutic perspectives would seem to be more easily achieved by the use of the classificatory method outlined above, in which a clinical inventory is made of the psychosomatic reaction type or types that are operative in the individual patient. Depending on the type of psychosomatic reaction or reactions in evidence, it will be recognized that the somatic manifestations will be either negligibly, moderately or maximally modifiable by the psychotherapeutic method (see chart on the psychosomatic spectrum). The co-existence of more than one type of psychosomatic reaction will of course complicate the diagnostic as well as the therapeutic picture. An adequate qualitative study of the intrafamilial atmosphere, inclusive of the mother-child relationship as well as the intrapsychic equilibrium of the child, will point up the individual nature of emotional problems that are complicating the diabetic management. This allows for a more specific structuring of the psychotherapeutic objectives.

It goes without saying that the interested pediatrician will be able to cope with the large majority of diabetic children and their families who are subject to some emotional disturbances. Which of these children need referral to the child psychiatrist who specializes particularly in the treatment of emotional disabilities in children? By and large one can make the general statement that when the psychological decompensation is moderately severe or extensive such a referral is in order. More specifically the indications for referral can be stated in somewhat different terms. Where there are circumscribed psychological problems which have arisen as a complication of and quite secondary to the onset of the diabetes and to its detailed management, such a child is clearly in the realm of pediatric care. On the other hand, in those situations where the pre-diabetic emotional state of affairs within the family and within the child indicates widespread disturbance, the psychological reactions to the appearance of diabetes are quite extensive and very severe. Psychiatric intervention is unequivocally called for under these circumstances, and hopefully a collaborative approach can be forged where

the responsibility for the total care of the child and his family is jointly shared by the pediatrician and child psychiatrist.

Specific Psychotherapeutic Perspectives

For discussion purposes it is perhaps wise to somewhat artificially approach the psychotherapeutic objectives as they appear on a pediatric practice level as well as on a psychiatric level by discussing such two categories separately.

Psychological Prophylactic Measures in the Pediatric Management of Diabetes. The following are the more major considerations:

1. An optimal liberalization of the diabetic regime: The individual nature of the diabetic child and his family must be kept in mind, as they will demonstrate variations in their tendency towards rigidity, their capacity for self-control and their abilities to withstand frustrations that are necessarily present in the adequate management of diabetes.

2. The avoidance of diabetic overcentralization in the family and in the child's way of life: The total living for the child may become incidental to his diabetes instead of the illness taking on a more marginal role in the total life situation of the individual.

3. The encouragement of age-appropriate self-management in the child: This becomes quite necessary to combat the very natural tendency for the diabetic child to rely quite excessively on the parent because of his disability.

4. The avoidance of psychological invalidism by the establishment of an adequate social-educational-recreational program.

5. Periodic emotional administration (support) for the child and his parents: Emotional insufficiency may often accompany insulin insufficiency in many diabetics.

6. Opportunities for emotional ventilation and expression in both parent and child: Group and individual psychotherapeutic situations allow for the possibility of direct expression of feelings about their diabetes and the details of its regulation.

7. The socio-economic rehabilitation of the family may be of major help in appropriate situations.

Psychotherapeutic Planning on a Psychiatric Level.

1. Child Guidance Clinic: In several situations, the severity of the psychopathological interactions in the mother-child relationship point to the need of a more intensive psychotherapeutic program for both mother and child. The facility of a child guidance clinic offers this type of a program.

2. Residential Treatment Center for Children: From time to time the actual divorcement of the child from a most pathological home environment becomes a necessity. Added to this indication, a few diabetic children may have very extensive psychiatric disorders which require a 24-hour residential treatment experience. An outpatient program which provides one hour per week of help for the child and his family may be insufficient to reverse such severe disturbances.

Conclusions and Summary

The term psychosomatic disorder has served as a convenient "waste basket" diagnosis which has not allowed for a comprehensive grasp of the multiple syndromes that fall under such a category. The author has presented a method of classification by his conceptualization of four major types of psychosomatic reactions which may occur individually or in combination in any one patient who is subject to a clinical illness. A chart has been used to demonstrate the practical etiologic, diagnostic and therapeutic perspectives to be obtained by such a nosological approach. For "trial run" purposes, and in order to demonstrate its clinical validity and applicability, the problem of the psychological aspects of juvenile diabetes has been studied with the use of such a psychosomatic inventory. It is suggested that a similar approach to other types of "psychosomatic disorders" may be somewhat helpful and rewarding.

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DEPRESSIVE REACTIONS ASSOCIATED WITH TEMPORAL LOBE-UNCINATE SEIZURES[1]

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According to Diethelm (3), "depressive reactions occur frequently in epileptics; they are characterized by marked thinking difficulties to the point of confusion, dullness and apathy". Jasper (7) has, however, pointed out that it is necessary to distinguish between psychopathological disturbances occurring as (a) direct result of epileptiform activation of specific cerebral areas or nuclei, (b) post-ictal states resulting from neuronal exhaustion, and (c) personality reactions towards the epileptic process.

It has been our experience that depressive reactions occur more frequently in subjects having "psychomotor" automatisms, particularly when these are associated with olfactory auras and/or seizures. We realized, of course, that "uncinate fits" are not typical temporal lobe signs *per se* as originally presumed by Jackson and Beevor (6), but are due to structural or electrophysiological "encroachment" upon the adjacent rhinencephalon, principally the uncus (4).

We observed ictal, depressive reactions in every one of six patients who suffered from temporal lobe automatisms *with* uncinate attacks. The neurological diagnosis of these subjects was as follows: atrophic lesion of the temporal lobe (2), angioma, temporal lobe (1), probable post-infectious lesion, temporal lobe (1), hypertensive encephalopathy with uncinate seizures (1), temporal lobe automatisms with olfactory seizures, unknown etiology (1). The odors were universally described as unpleasant ones. Depressive episodes lasted for several minutes to 14 days. One patient stated: "for two weeks I felt 'blue' and cried, and the smell of fat on a hot stove kept coming back."

Gibbs and Gibbs (5) do not mention the occurrence of *olfactory* auras in petit mal nor in petit mal variant epilepsy; the same authors observed olfactory auras in only .3 per cent of subjects having grand mal epilepsy, but in 1.5 per cent of patients afflicted with "psychomotor epilepsy" (1.1 per cent of patients having an anterior-temporal focus). Gibbs and Gibbs (5) give the following corresponding figures for *depressive* episodes: 0 per cent in petit mal., .5 per cent in petit mal variant, .1 per cent in grand mal epilepsies, but 2.1 per cent in "psychomotor epilepsy" (3.6 per cent in subjects with anterior-temporal focus). These percentage figures are small, but their relationship may be significant.

Mulder and Daly (15) examined one hundred non-institutionalized patients who had lesions of the temporal lobe and whose presenting complaints were usually thought to be psychiatric. Among paroxysmal symptoms, olfactory hallucinatory experiences (usually disagreeable!) were described by 16 patients; exactly the same number had depressive episodes! The psychiatric symptoms of this group could be distinguished from "functional" emotional disorders by their "paroxysmal occurrence, by their inappropriateness to the total situation and by the association of other symptoms and findings suggestive of lesions in the temporal lobe."

Among our six patients having the combination of uncinate-temporal lobe seizures and paroxysmal depressions were two subjects we could repeatedly examine from a neurological, psychiatric, and electroencephalographic viewpoint over 6- and 3-year periods, respectively.

D. M., a 39-year-old white bartender (himself an abstainer!) presented himself first in July, 1948, with the chief complaint of recurrent depressions and "memory failures." Patient sustained at the age of 19 a severe cerebral concussion. He commenced having "convulsions" 2 years afterwards which occurred as often as two to three times weekly. One year later episodes occurred when the patient found himself in different places "without knowing how he got there." This was followed by depressive reactions. He also noted that "impres-

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sions from the outside world wouldn't register in him for days." Episodes occurred when he "felt here and there at the same time, a two-point feeling." According to relatives D. M. would talk occasionally "beside the point." More and more *depressive episodes* occurred when patient perceived odors like "stuffed cabbage in a dirty outhouse"; "a change of odor from the outside would place him somewhere else." Persons in his environment appeared "strange and unfamiliar" even though they were family members. He experienced typical "déjà vu" experiences. At other times "the whole world would appear to sway forward, whereas he was standing still." For hours "he felt inside paralyzed and couldn't follow through an act"; at one time the patient stood motionless for 3 hours.

All these episodes occurred paroxysmally, lasting from minutes to days; at other times patient felt "absolutely normal."

Patient was treated originally by four different neurologists and psychiatrists, some employing even electrocoma treatments. There was very little improvement except for disappearance of grand mal seizures under heavy Dilantin medication (.5 gm. daily). Yet the patient's olfactory hallucinations, "memory-lapses," and depressive episodes became more pronounced. At one time, patient felt depressed, dreamy, and sleepy and suffered from "recurrent odors" for 10 days. Patient noted occasionally numbness of both right extremities following these episodes.

The clinical neurological examination showed nothing unusual except for a fine lateral nystagmus, complaints of "occasional" diplopia on left *and* right lateral gaze, and a slight accentuation of all deep tendon reflexes on the right. Neuro-ophthalmological consultation revealed normal blind spots, diplopia fields, phorias, and visual fields. A left-sided arteriogram showed no pathological changes. A neuro-surgical consultation confirmed our minimal neurological findings. Pneumoencephalogram revealed an excessive amount of fluid, i.e., 205 cc. However, "there was some increase of subarachnoid air over the anterior and temporal areas, particularly the left."

Serial EEG's were obtained over the years and showed good correlation between temporal lobe EEG paroxysms, olfactory hallucinations, and depressions (Fig. 1). Olfactory attacks as well as depressive episodes could easily be "activated" by hyperventilation.

D. M. is now maintained on Dilantin and Phenurone medication. His depressions show suicidal depth unless this medication is supplemented by Dextroamphetamine medication. It was also noted that Desoxyephedrine (Desoxyn) intravenously usually alleviates a depressive attack as well as olfactory hallucinations.

The second patient we were able to study over several years showed again the relationship between temporal lobe automatisms/uncinate attacks and paroxysmally occurring, severe depressions:

B. K., a 19-year-old typesetter was first seen in June, 1951, for an EEG evaluation. Following a severe bout of scarlet fever at the age of two years, he began to have episodes of "semiconsciousness and unconsciousness without twitchings," followed by confusional states for minutes to several hours. These attacks, poorly described by the patient and his mother, subsided at the age of 12 years. He had then, however, episodes of "sadness without cause," crying attacks, and occasionally perceived "peculiar odors." Attacks reoccurred at the age of 17 years in a different pattern. He noted "indescribably bad odors," occasionally associated with a "funny taste," felt "emotionally upset," and had an "urge to cry." This was followed by episodes lasting for several minutes when he talked "perfectly silly without control"; his arm felt "stiff" during these episodes, and he was "completely confused" afterwards, sometimes for as long as one hour. Following this he felt depressed for hours and sometimes for "1 to 2 weeks." Episodes of depression occurred occasionally without confusional states and uncinate attacks; they were frequently associated with irritability and forgetfulness. During a depressive episode an EEG was taken which showed right midtemporal slow-wave dissociation in the theta-band, (75 μv.). Hyperventilation produced paroxysmal 3–5/sec. activity over the right temporal area, with a subsequent "spread" to the left temporal area. Skull x-rays, pneumoencephalogram, and lumbar puncture were reported as being within normal limits.

The patient reported a worsening of depressive episodes, usually following "odor attacks" when reexamined in June, 1952. He kept very adequate records and reported eight "odor attacks" monthly and seven attacks of "talking silly and becoming confused." Neurological examination revealed gross horizontal nystagmus on right lateral gaze, first-degree nystagmus on left lateral gaze, accentuation of all deep tendon reflexes on the left with depression of abdominal reflexes on the same side. He was eventually placed on combined Phenurone, Hibicone, and Mebaral medications he improved, particularly in regards to uncinate attacks and depressions. He had only two "confusional" states in February, 1953, no "odor attacks," no depressions.

We were able to do an EEG recording during a typical temporal lobe attack in September, 1953, which progressed as follows: 1) peculiar odors, 2) depression and crying, 3) masticatory movements, 4) headturning to the contralateral side (left), 5) tonic extension movements of left arm, 6) same movements spreading to left arm *and* left leg, 7) exhaustion and confusion (Fig. 2, 2A).

Prior to hyperventilation patient felt emotionally well, and his EEG disclosed only very isolated right temporal sharp waves. B. K. could never adequately account for the psychodynamisms of his depression. "I thought first it was due to the fact I had these attacks of 'black-out and odors'; but I got depressed even when I didn't think about them; (depressive) feelings came and left me suddenly." The depressive attacks could be improved by adding Dextroamphetamine sulfate (Dexedrine®) to his anti-convulsant medication.

Comment: It appears that patient D. M. developed grand mal seizures following a severe concussion which were soon followed by olfactory attacks and typical "psycho-

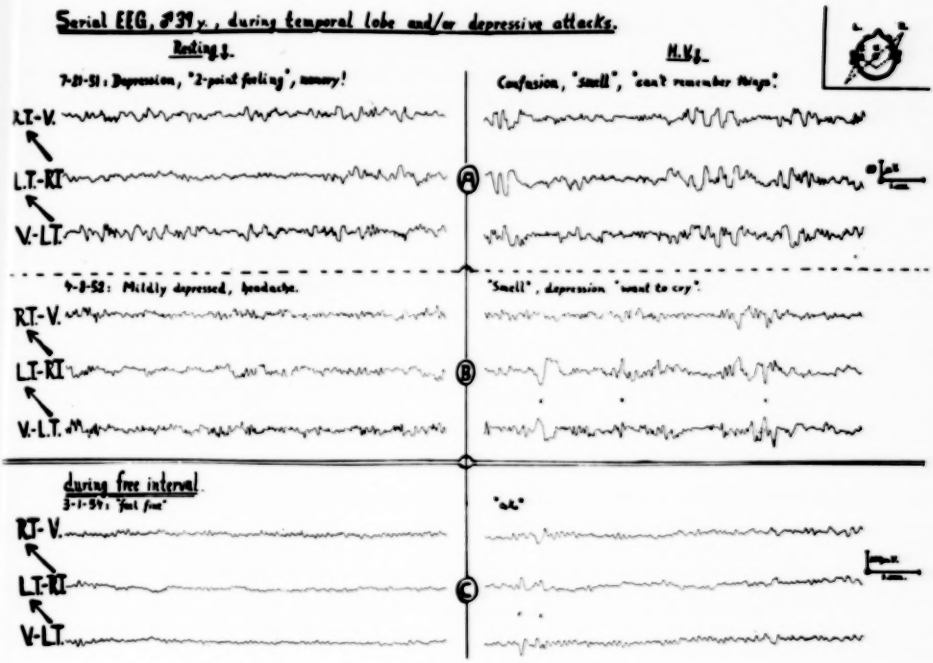

FIG. 1

(A)

7-21-51

Resting Status	Hyperventilation Status
Clinical: Severe depression, "blank" feeling, "2-point-feeling", memory "loss".	Confusion, "outhouse-smell", déjà vu experiences, "can't remember"
EEG: Bitemporal synchronous and asynchronous 4½–6/sec. bursts (60–70 μv.).	4–5/sec., square topped, slow-paroxysms, bitemporal (75 μv.).

(B)

4-8-52

Clinical: Depression improved, headaches, very few odors.	Olfactory hallucinations, "wants to cry."
EEG: Change of pace, 6½–8/sec. activity, 20–22/sec. fast cycles, bi-temporal (60 μv.).	3–5/sec. sharp waves, occasional spikes, left temporal reversal of phase (100 μv.)

(C)

3-1-54

Clinical: No complaints.	No discomforts.
EEG: 8–10/sec. activity (30 μv.).	Isolated, left temporal theta waves, basic rhythmicity maintained.

motor" automatisms. However, his chief complaint consisted of strictly paroxysmal, depressive episodes associated with "odor attacks" and "déjà vu" experiences. The depressive cycles lasted from several hours to several weeks and seemed to bear no particular relationship to events in patient's life. Serial EEG's revealed a good correlation between degree of temporal lobe paroxysms and depressiva phenomena (Fig. 1). The depressive states were almost universally accompanied by olfactory hallucinations.

Penfield and Rasmussen (17) could demonstrate the occurrence of similar "strangeness and familiarity experiences," "illusions of introspection," and "memory disturbances"

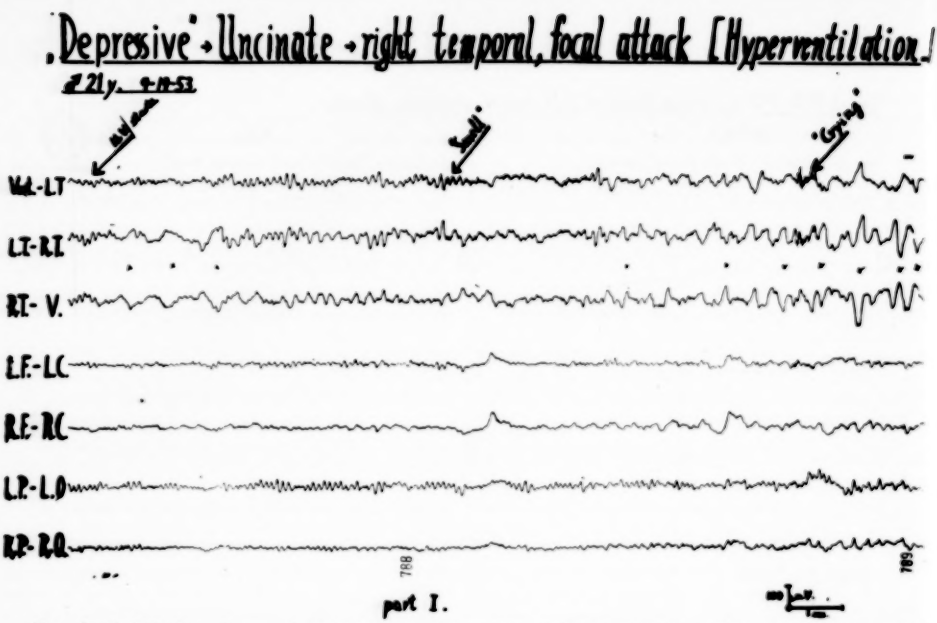

FIG. 2. Relatively well organized 9½/sec. activity prior to hyperventilation. HYPERVENTILATION begins: Delta activity at once noticeable over the right temporal area; the suppressed alpha activity is superimposed. Alpha activity over the right fronto-central areas shows concomitant suppression. Patient mentions "SMELL": One sharp wave occurs over the *left* temporal area, followed by high voltage delta and theta slow waves in phase reversal over the *right* temporal area. "CRYING": EEG shows 3/sec. paroxysmal sharp wave activity over the right temporal area (150 μv.).

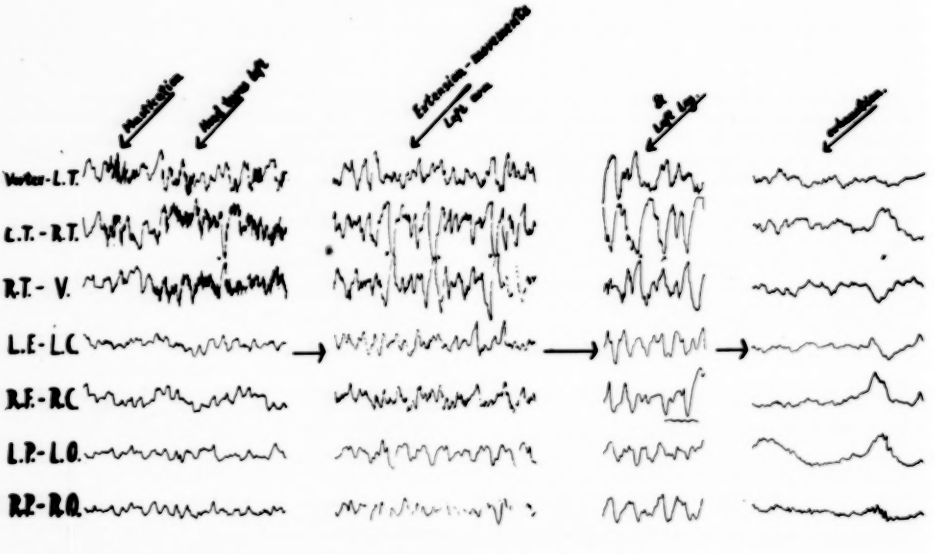

FIG. 2A. EEG recording of right temporal seizure, continuation of figure 2

MASTICATION: Autonomic masticatory movements. Muscle spindles, but also genuine spikes, appear in the EEG over the right temporal area (200 μv.). The alpha activity over the right parietal-occipital derivation has by now disappeared. HEAD TURNS LEFT: Patient is semiconscious. More high voltage spikes appear over the right temporal area. Tonic EXTENSION MOVEMENTS LEFT ARM: Sharp waves and spikes (300 μv.) appear over the right temporal area. Tonic EXTENSION MOVEMENT OF LEFT ARM *AND* LEFT LEG: EEG shows sharp delta paroxysms over right temporal *and* right fronto-central derivation ("spread" of discharges!). "EXHAUSTION": Patient is semiconscious, sobbing, confused, shows some automatisms. There is general suppression of cortical, electrical activity in the EEG, but random ½–1½/sec. slow waves (in phase-reversal!) are still noticeable over right temporal area.

during temporal lobe stimulation. "Feelings of tiredness and sleepiness" with impaired consciousness were reported by Kaada and Jasper (11) following electrical stimulation of the temporal lobe, the hippocampal and limbic gyri and the insula in man. However, the respiratory inhibition mentioned by these authors as well as by Liberson, Scoville, and Dunsmore (12) was only observed in our patient B. K. prior to temporal lobe seizures.

Even though patient D. M.'s EEG revealed predominantly left temporal "firing," sharp and slow wave bursts were noted also over the right temporal area (fig. 1). Jasper, Pertuisset, and Flanigan (8) could demonstrate "that in almost half the patients operated on the bilateral electrographic localization seemed to be due to the localization of a *unilateral* epileptogenic lesion in the temporal cortex . . . capable of epileptic activation of both temporal lobes . . . ." These authors state that "this seems especially true with atrophic lesions of the uncus and hippocampal system." Baldwin, Frost, and Wood (2) noted that epileptiform discharges in one amygdaloid nucleus may spread rapidly across the midline to the other amygdaloid nucleus. The discharge "need not originate in the amydgaloid nucleus itself" and "may arise in the temporal cortex and spread to the amygdala beneath."

Patient B. K. showed clinical and EEG evidences of unilateral, temporal lobe "firing." One seizure could be recorded electroencephalographically (Figs. 2, 2A) and showed a rather typical symptom-progression condensed in a short time span: 1) peculiar odors, 2) depression and crying, 3) masticatory automatisms, 4) contralateral headturning, 5) tonic extension movements of left arm, 6) extension movements spreading to left arm *and* left leg, 7) exhaustion and confusion, 8) emotional depression.

Magnus, Penfield, and Jasper (14) emphasized that mastication in seizures is not comparable to classical, Jacksonian phenomena, but that it constitutes an automatism, associated with disturbance of consciousness. According to the same authors, contraversive turning of the eyes and head is also frequently observed in temporal lobe seizures. This, as well as the slow jerking movements of the extremities, could be reproduced by Kaada, Andersen, and Jansen (10) following electrical stimulation of the amygdaloid nuclear complex in unanesthetized cats. These responses were obtained mainly from the phylogenetically old antero-medial division of the amygdaloid nuclei which receive fibers from the olfactory bulb. However, stimulation of the phylogenetically younger basolateral division produced behavior changes very similar to those obtained by stimulating the hippocampus and the medial prefrontal, limbic, retrosplenial, and hippocampal cortices, namely fear, anger, and stereotyped searching (9). It should here also be considered that temporal lobe seizures may also be triggered from deeply situated structures of the thalamus and basal structures (1).

It appears, therefore, judging from experimental, clinical, and electrographic evidences, that the whole hippocampal-amygdaloid-temporal lobe complex with all its connections may participate in epileptic "automatisms." It is strange that the close relationship between uncinate/temporal lobe seizures and depressive phenomena has not been observed by more investigators; the relationship between rhinencephalon and emotional expressions, as demonstrated by Kaada and coworkers and other investigators in animals, would lend itself very well to further clinical observations. However, ictal emotions such as fear, fright, and sadness were described by Penfield and Jasper (16) as associated with temporal lobe disturbances and also with stimulation of the temporal lobe in man; "isolated fear" as temporal lobe aura has been noted by Macrae (13).

It seems significant that all six subjects who had uncinate-temporal lobe seizures also had ictal, depressive episodes; these episodes did not lend themselves to psychotherapy at all but disappeared rather promptly following energetic anti-convulsant therapy and/or Metamphetamine (Dextroamphetamine) administration. Unpleasant, olfactory hallucinations frequently accompanied these depressive cycles and disappeared once the depression was relieved.

Some depressive reactions occurring in patients having temporal lobe seizures may, of course, be related to an awareness of defective functioning (15). However, the close relationship between EEG abnormalities and depressive phenomena in two patients followed

over some length of time may also indicate that this type of emotional depression may be considered as constituting abortive, temporal lobe seizures which become "arrested" before a "complete attack" occurs; from the viewpoint of the clinician they may be considered analogous to subclinical, temporal lobe "firing." This particular type of depressive reaction may in other instances also constitute a clinical manifestation of after-discharges following activation of the hippocampal-amygdaloid-temporal complex.

Summary

(1) Paroxysmal depressive reactions lasting for hours to weeks occurred in six subjects whose chief seizure manifestations consisted of uncinate attacks and temporal lobe automatisms.

(2) Depressive episodes preceded or followed seizures or occurred paroxysmally in the "free interval" between seizures. These episodes had a rather sudden onset, were refractory to psychotherapy, and frequently disappeared abruptly under energetic anticonvulsant therapy or Metamphetamine hydrochloride (Desoxyn®) and/or Dextroamphetamine sulfate (Dexedrine®) medication.

(3) Accompanying olfactory hallucinations also ceased once the depression subsided.

(4) Two patients could be followed clinically and electroencephalographically over several years. A definite relationship between temporal lobe paroxysms in the EEG and depressive episodes clinically could be demonstrated.

(5) It is postulated that this particular type of depressive reaction may be due to subclinical "hippocampal-amygdaloid-temporal lobe" epilepsy and/or due to after-discharges from the same structures following manifest seizure activation.

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A STROBOSCOPIC METHOD FOR ESTIMATING NAILFOLD CAPILLARY BLOOD FLOW IN THE SKIN OF MAN

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Methods currently available for the estimating of rate of blood flow in minute vessels have been fairly recently reviewed by Green and his collaborators (5). They are open to numerous objections from the viewpoint of capillary physiology: many (including the Ludwig-type Stromuhr, moving piston meters, bubble flowmeters, thermostromuhrs, rotameters, and electromagnetic flowmeters) are unsuited for use in man; some (like the various techniques for estimating skin temperature) are readily applicable to clinical use but depend for their indirect relationship with blood flow more on factors of arteriolar tone than upon capillary variation; others, also suitable for human use, are similarly contraindicated as capillary flow monitors (e.g., the Burch finger plethysmograph (2) records changes from unknown vascular combinations, while the Hertzman photoelectric plethysmographic photometer (6) depends upon minute pulse variations, and hence at least upon an arteriolar component).

Although restricted topographically, direct visualization of the capillary bed offers perhaps the most precise and attractive method of ensuring that the field of examination contains none but true and pre-capillary vessels. The studies of Chambers and Zweifach (3, 4, 12) on rat mesoappendix and dog omentum are outstanding in demonstrating the potentialities of this technique, but their method of blood flow estimation is qualitative rather than quantitative and is not applicable to human studies.

The present paper introduces a method of estimating blood flow differentially in the terminal arterioles, pre- and true capillaries of man by direct microscopy of the minute vessels of the nail fold skin.

Methods

Visualization of the finger nail fold capillary bed is obtained by means of a Leitz capillary microscope fitted with a $\frac{2}{3}$ or $\frac{1}{6}$ objective and a $\times 10$ ocular. In this type of microscope illumination is provided by reflected light from a built-in source. The skin is treated with a refractile oil and the microscope racked down until the vascular arrangement is clearly seen. So that reference points may be preserved for future use, the field is sketched on a sheet of paper, aided if necessary by a simple camera lucida drawing, or by the technically more difficult photomicroscopy.

Under these conditions the vascular field contains true capillaries in nearly every subject examined while in some subjects, and particularly in certain groups of psychiatric patients, transverse-lying arterioles and precapillary forms are also apparent. In any event a field choice is made of those vascular units which appear to be characteristic for the individual subject and these are examined one at a time.

Blood flow by direct visualization in capillaries of the nail fold area is typically intermittent and varies with the actual morphology of the unit and the state of tonus of the vessel wall. Figure 1 gives some examples of the sort of way in which separate capillary forms can change their appearance over a 10 min. period of observation and figure 2 illustrates the influence of these variations on the movement of the cells within the lumen. If a method were available for timing the surges of corpuscular movement across a given point along the lumen, it should be practicable accurately to estimate capillary blood flow. It has been found that this is possible by the use of stroboscopic partial illumination of the field.

Once the dynamic vascular morphology has been determined in the manner outlined above, the microscope illumination is dimmed and supplemented by the flickering light output of a slow speed stroboscope.[1] In practice the stroboscope is tilted towards the subject's finger with the light flickering at a flash rate of 20 to 30 c.p.s. and the built-in microscope lamp

[1] A General Radio Company (Cambridge, Mass.) "Strobotac" model 631-BL, was used for this work.

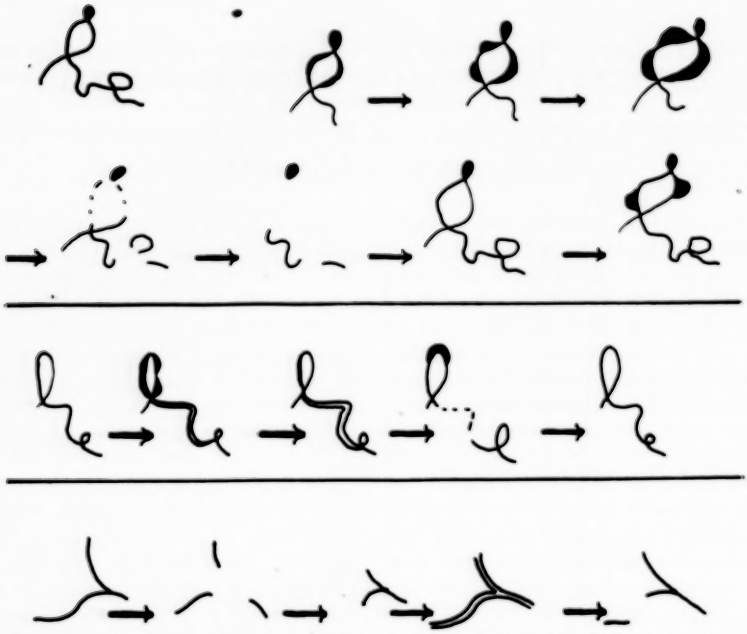

FIG. 1. Three examples of true-capillary, pre-capillary and arteriolar morphological units showing changes in tonus of the vessel wall during 10-min. observation periods. Extent of vasotonus is a significant variable in determining corpuscular flow.

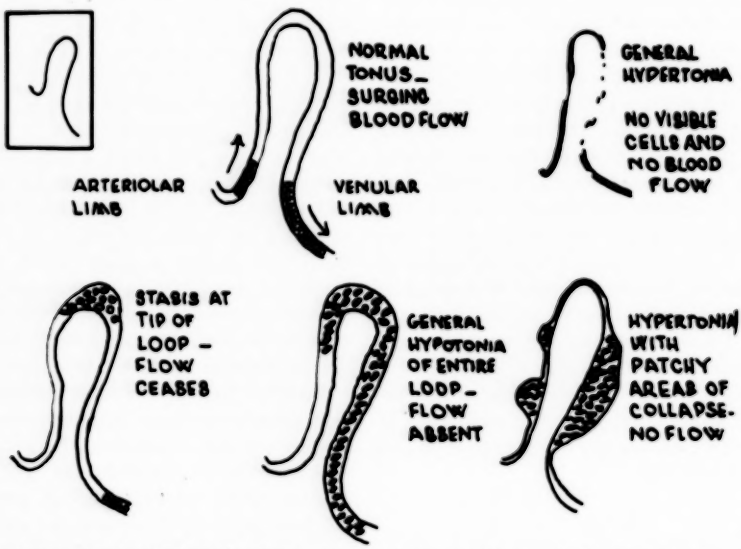
NORMAL TONUS – SURGING BLOOD FLOW
ARTERIOLAR LIMB
VENULAR LIMB
GENERAL HYPERTONIA
NO VISIBLE CELLS AND NO BLOOD FLOW
STASIS AT TIP OF LOOP – FLOW CEASES
GENERAL HYPOTONIA OF ENTIRE LOOP – FLOW ABSENT
HYPERTONIA WITH PATCHY AREAS OF COLLAPSE – NO FLOW

FIG. 2. Influence of generalized and localized vasotonus changes on corpuscular flow. The capillary unit illustrated in the top left hand corner of the figure is the prototype for each of these changes.

dimmed progressively until the flicker is discernible in the vascular field as viewed through the eyepiece. The stage is now set for timing the speed of corpuscular streaming and, by focussing on a pre-determined capillary unit and waiting until cell movement takes place, it is a relatively simple matter to adjust the speed of the stroboscope until the red cells passing a selected portion of the loop appear to stand still. Reading this speed off the scale of the stroposcope gives the speed of the cells passing the point of observation. Since this illusion of cessation of cell movement will be elicited not only by the fundamental frequency of the flicker but also by its harmonics, it is necessary once the background light intensity has been determined to commence the timing operation at the slowest available operating speed of the stroboscope (e.g., at 1 c.p.s.) and then gradually to increase the speed, rather than working down from a high flash rate.

Results

The velocity of corpuscular motion in the capillaries of the nail fold skin as estimated by this technique would appear to be determined by a number of variables. From an experience based on some thousands of observations, we believe these variables principally to include the morphologic structure of the capillary unit, the degree of vasotonus of the vessel wall, the hydrostatic pressure of blood within the lumen (the capillary blood pressure), the relative integrity of the vessel wall (the capillary resistance or permeability), the viscosity of the contained blood and the intermittency of flow which is characteristic for capillaries in some, though not perhaps all, parts of the body. Extra vascular "field" factors must also be included in this list since it seems probable that local tissue oxygen demand represents an ultimate determining variable in terms of the corpuscular delivery of oxyhaemoglobin. The relative influence of most of these factors in terms of flow will not be analysed in this methodological report but will be published elsewhere. For the present communication we shall mention only some findings basic to the technique of measurement.

The Range of Corpuscular Flow Rates. This may vary from zero up to rates as rapid as 60 to 70 corpuscles per sec. Generally speaking, the flow under a given set of conditions is reasonably constant, e.g. an open, single, untwisted, mature, hairpin loop in a state of normotonus and at a capillary pressure at the summit of its loop of 20 mm. Hg might show a blood flow of 40 corpuscles per sec., with a variation of 5 per sec. on either side of this figure. In another set of circumstances, e.g. in capillaries of a more primitive ontogenetic morphology with a normotonic wall, or in developmentally mature vessels whose walls are in a state of either hypertonus or partial collapse, flow is characteristically significantly slower and may vary only between 2 and 5 corpuscles per second, with a capillary blood pressure of 40 mm. Hg. Occasionally, and always in our experience in association with pathological circumstances and only for short durations of 1 to 30 seconds or so, flow may be immeasurably rapid. Theoretically of course even these rates could be readily counted but in practice the stroboscope dial cannot be swung quickly enough to catch these excessively rapid periods of flow before they diminish to more normal rates again.

Intermittency of Corpuscular Flow. It is not easy to generalize about the intermittency shown by the flow in the nail bed capillary fields since so much variation occurs from subject to subject. It does seem however that under normal conditions approximately half the vascular units in a field show flow at any one time, the remaining half remaining empty. Sooner or later these circumstances change and flow is seen in many previously empty capillaries while the former active units now become dormant.

Among the many factors which appear to contribute to this episodic intermittency of flow are the relative developmental maturity of the capillary unit under observation (the structurally mature capillary tends to show activity more often and for longer periods than the more primitive forms), the extent of dysplasia (morphologically bizarre or multi-twisted forms appear to have less flow than less complicated units), the degree of vasotonus (flow becomes erratic or ceases altogether with extreme tonic contraction or extreme dilatation), the extent of localization of the vasotonus

(flow stagnates when areas of localized contraction or extreme saccular collapse appear in the capillary walls), and the situational or psychological "set" of the subject. More will be said of the relevance of this "set" to flow-intermittency in a subsequent communication; here it must suffice to say that, under conditions of alertness, concentration, empathy and good rapport, flow is not only more rapid but the duration of the latency period when flow ceases is shorter than under conditions of apathy when the subject is operating at a lower degree of awareness. It would seem, in other words, that a biological relationship exists between rate and intermittency of capillary corpuscular flow and the tissue metabolic rate and, further, that this nail fold phenomenom is reflecting the much more generalized metabolic status of the subject.

As an indication of the sort of range of flow intermittency we have seen in our subjects, the results of two separate observation periods may be cited. On the one occasion it was seen that approximately half the capillaries of the microscopic field were active, the vascular morphology was relatively mature and not dysplastic and tonus was present in the majority. During the observation period in an attentive subject, flow was measured continuously and was found to range between 15 to 19 corpuscles per sec. at capillary pressures of 22 to 40 mm. Hg. During the ten minutes, flow ceased for 30 to 50 seconds at the second, sixth and tenth minutes of observation. Each time it returned, it started again at the former flow rate of 15 to 19 corpuscles per second. On another occasion a similar ten minute observation period was made on a microscopic field showing capillaries whose morphology was more primitive and more dysplastic, whose tonus was poor with considerable dilatation, and in a subject who was restless and emotionally disturbed. Flow was found to be fairly constant at 3 corpuscles per sec., at capillary pressures of 40 to 60 mm. Hg. During the total observation period the flow ceased after the first minute, restarted at 3 corpuscles per sec. at the third minute but endured only for 40 seconds. Stagnation then occurred for the next 90 seconds and was followed by resumption of flow at 3 corpuscles per sec. for 2 minutes, to cease again until the 10 minutes was complete.

Comment

The use of data derived from single capillary loops has been criticized as frequently misleading (12) yet it is admitted by the same writer that they are essential to the performance of certain capillary function tests—e.g. the epinephrine response. The enormous advantages of a technique applicable to man which involves neither anaesthesia nor the handling of delicate visceral tissues are summative in experimental psychiatric research in view of the considerable evidence of nail fold capillary developmental morphological retardation and dysplasia in mentally-ill patients (9) and of the growing literature concerning the correlation between emotion and the changing hemo-dynamics of the minute vessels of peripheral tissues (1).

Psychiatrists have been interested in capillary functional disturbances at least since Spielmeyer's (11) early observations and firm correlations have been made between specific forms of mental dysfunction and both with gross anomalies of the vasculature (8) and with its more minute extensions (7, 10). Less attention has been given in the past to the physiological reverberations of these anomalies, perhaps for the reason that methodologies suited to their study were not available. The relevance of rate of corpuscular blood flow to mental state begs the whole question of the role of tissue anoxia in psychiatry, and the methodology presented here provides a practical technique by which precise investigation can be made of this factor under a wide variety of kinetic circumstances.

Summary

1. No method exists for the accurate clinical determination of capillary blood flow in man. A simple yet practical technique for this is presented in which the rate of passage of corpuscles past a given point along the nail fold skin capillary wall is timed by means of a stroboscope.

2. The range of capillary blood flow (in corpuscles per second) is given for a variety of conditioning circumstances and the relationship of the findings to tissue anoxia in psychiatry is discussed.

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THE CAPILLARY SYSTEM IN PATIENTS WITH PSYCHIATRIC DISORDER: THE ONTOGENETIC STRUCTURAL DETERMINATION OF THE NAILFOLD CAPILLARIES AS OBSERVED BY PHOTOMICROSCOPY

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The comparative morphology of that part of the capillary vascular system visible without trauma in man has interested psychiatrists almost as long as its phenomenology has been known. Lombard (21, 22) was probably the first to demonstrate that the structure of the skin capillaries could be observed microscopically after cutaneous treatment with a refractile oil and suitable illumination, a technique further developed by Weiss and his coworkers (43, 44). The relationship of the nail-fold capillary network to the vessels lying beneath the surface of the skin was intensively studied by Spalteholz (39, 40) and by Sir Thomas Lewis (20). Lewis' illustrations show the nail-fold capillaries in health to consist of numbers of tiny hairpin-shaped vessels lying roughly in rows the most distal of which extends nearly to the cuticle of the nail. The hairpins are so arranged that their acute angles point towards the nail thus forming part of a semi-circle around the nail bed area. Considerable variation occurs in the actual number of capillaries to be observed per square millimeter of skin but this seems to depend upon the site of skin examined since it has been shown (45) both that the prevailing skin color is in some measure determined by the capillary representation in it and that the number of capillaries per square mm. in any one skin area remains appreciably constant from youth to old age.

In 1921 Parrisius (31) and also Muller (27) called attention to certain structural anomalies they had observed in the nail fold capillaries of "vasoneurotic" patients and so initiated a series of capillaroscopic studies on psychiatric subjects which has continued sporadically to the present time. This literature has recently been briefly reviewed (23). Microscopic investigation of the nail bed capillaries has been shown to differentiate healthy adults from mentally defective children (15, 33, 46); from epileptics (9, 10, 28, 32, 35); from patients with migraine (9, 10); from schizophrenics (11, 19, 29, 42); from patients with affective disorders (11, 30); from psychoneurotics (3, 5, 9, 10); and from criminal psychopaths (41).

The concept of maturation is one of increasing relevance to psychiatry. As the writer of an annotation in the British Medical Journal (1953) has pointed out, "countless clinicians have been struck by the fact that the personalities of many of their psychiatric patients show qualities which they associated rather with children or adolescents than with fully adult persons." Recent attempts at quantifying some of the dimensions of immaturity in psychiatric patients have proved as rewarding as has been their demonstration in patients with purely physical disorders (6). In the field of morphology, for example, it has been shown (25) that a persistence of dysplasia of certain infantile anatomical characteristics exists differentially in a mentally ill population and that the loading of such traits is significantly greater in these patients than in a healthy control group of comparable sex and chronological age. Similarly with emotional development (26). In this sphere of reference the findings were identical and in both it was found that immaturity tends normally to decrease with increasing age, the growth potential of the patients being less than that of the healthy controls. Constitutionally again, Kretschmer (17) found it necessary to include a "hypoplastic" type of bodily habitus in addition to his three main somatotypic groups while, in the field of function, Hill (13, 14) and others (36) have demonstrated similar trends of neurophysiological immaturity in the E.E.G.'s of certain chronologically adult psychiatric patients.

The morphological growth of capillaries, as exemplified by capillary microscopy of the nail fold units in man, affords a further means of constitutional investigation of patients with mental disorders, and one which has important physiological implications since the capillary

represents the "final common pathway" (24) of all the blood constituents to the tissues. Immaturity has been specifically noted in these capillaries in relation to feebleminded children (15, 34), patients with myxoedema (18) and those with various psychoneuroses, epilepsy and schizophrenia (9–11, 42). The present communication represents an attempt to bring biometric methods into the analysis of capillary structure and to find out the specific influence of ontogenesis at this particular level of constitutional functional morphology.

Clinical Material

This consisted of a total of 332 subjects. Of these 96 were healthy controls of an age range of 18 to 58 years. The remaining 236 were patients suffering from a variety of psychiatric disorders. This latter group included 40 patients with psychopathic personality (14 "aggressive" and 26 "inadequate" psychopaths classified in accordance with Henderson's (1939) criteria); 73 with psychoneurosis (40 anxiety states and 33 hysterics); 15 with idiopathic epilepsy; 58 with affective disorder, all in a depressive phase of their illness; and 50 patients with schizophrenia. The ages of the patients were comparable with those of the controls and ranged from 17 to 62 years and the sex ratio of both groups was nearly unity.

The social and economic background of both main categories of subjects was similar; the intelligence range of both was bound by the "normal" limits of the I.Q. tests employed; none of the control group had ever suffered a mental breakdown as far as could be ascertained; and the diagnoses of the patients were always checked by the consensus of opinion of at least two competent psychiatrists. The only other selection procedures adopted were to exclude from the investigation subjects with maimed, toil-hardened or diseased fingers and those patients in whom two concurrent psychiatric diagnoses had been entertained (e.g. those with "schizoaffective disorder").

Methodology

Capillary Microscopy and Photomicroscopy

The nail fold skin of the ring fingers of both hands was the site selected for examination, since most previous workers agree that this is the most suitable. The choice of this finger is not particularly critical but the arguments discovered in the literature (e.g. the relatively protected position of the ring finger in the hand, the liability of the index and middle fingers to trauma, and the greater incidence of abnormal capillaries in the little finger) influenced the decision.

Some 85 per cent of the fields studied were photographed and the prints filed for later examination; the remainder were drawn in pencil by the observer during microscopic observation. Drawing was employed also as a check on the photography in the vast majority of all the subjects. This precaution proved to be necessary because of the great difficulty of obtaining clear prints in many subjects and because only after development of the film could its suitability for inclusion in the study be ascertained.

A Beck microscope with a built-in moving stage was used. A specially constructed plastic plate on which were mounted two stout parallel brass strips about 2½ in. long by ⅛ in. thick, the long axes of which were placed together below at right angles to each other forming a V to receive the subjects finger. The brass strips were maintained in position by a rocker controlled by thumb screws so that the finger when once in place could be rotated through an angle of 15°. In addition the exact position of the finger could be controlled by the moving stage and the area for examination thus brought exactly under the microscope objective. All bright metal was treated with shellac to obviate reflexion. The fingernail fold was treated with immersion oil prior to microscopy, the field was focussed by means of a 2/3 objective and finally assayed by means of a 1/6 Zeiss apochromatic objective. A ×10 eyepiece was used throughout.

The problem of suitable illumination required much preliminary experimentation. In the absence of an arc source, a 110-volt, 750-watt G.E. projector-type incandescent lamp was used, a heavy duty 15-amp. output transformer enabling it to be run off the A.C. main supply. The filament of the lamp was conveniently small (about ¼ in. square) and permitted a point of light to be focussed through a pair of suitable lenses mounted on a rack structure in front of the lamp housing. The very great heat generated by this light source necessitated both an electric fan below the

lamp house to blow the excess heat upwards and also, since heat-resisting glass was found to crack in a matter of minutes, a large water cell placed in the path of the light beam to protect the subject's skin. Cowling above the lamp kept the unwanted blinding light away from the eyes of both subject and operator. A blue-green filter gave a greater contrast between the colour of the capillaries and that of the background. A Leica camera was mounted vertically above the microscope and an auxiliary eye-piece inserted between the two, the aperture of the eyepiece being arranged so that closure to light was attained synchronously with the shutter of the camera. A high speed panatomic film was used and a special developer prepared to enhance the speed yet minimize grain. Notwithstanding these precautions, although photography of the minute structure of the capillaries through the skin yielded results which could be rated and interpreted, their reproduction for publication purposes left much to be desired and drawings were in any event to be preferred for reference to fine detail.

The field deemed ideal for investigation was that observed under the 1/6 objective focussed just proximal to the cuticle in the nailfold area and as close to the midline of the dorsum of the finger as possible. To obtain optimal visualization of all the capillary elements present in the field it was necessary to focus up and down with the fine adjustment of the microscope, drawing each capillary as it came into view and following it along its length to the limit of the resolution of the lens system. This technique emphasized another practical difficulty to photography and an attempt to overcome it was made by taking a series of exposures each at slightly different levels, afterwards placing them together as a composite picture in the fashion of aerial photographs.

Evaluation of the Field Characteristics

A survey of the literature reveals, in general, attempts by workers in capillary microscopy to cover functional as well as structural abnormalities and this often occasioned the assessment of qualitative as well as quantitative factors. Thus Olkon (29) expressed the capillary anomalies he found in his schizophrenic patients in terms of the unit, size, number, colour, arrangement and distribution, stream and tonus. Each of these assessments carried an equal value (12.5 per cent of the total) in the final evaluation and the total expression of abnormality was equated against diagnosis for comparison with the healthy controls. Hauptmann and Myerson (11) in like fashion referred to regularity of distribution and relationship to deeper vessels in addition to the anatomical structure of the capillaries themselves. In this present report we shall concern ourselves solely with morphology, i.e. with the actual configuration of the capillaries seen in the field in an attempt statistically to discern whether such purely structural and unitary differences might exist between healthy subjects and psychiatrically-ill patients. To this end a series of nine different and distinct capillary forms were distinguished on developmental and empirical grounds and the incidence of each form counted in representative fields of both hands. This incidence was then expressed as a percentage of all the forms for purposes of evaluation. It was found that all discoverable varieties of capillary abnormality could be subsumed under these nine categories. The nine capillary forms chosen were as follows: 1) *Normal adult "good" hairpins;* 2) "*Poor hairpins*" in which shape was imperfect, or bent to one side, or short, or incomplete; 3) "*Single twists*" in which the normal or poor hairpin form presented with one twist in its loop; 4) "*Double twists*" in which two or more twists in the loop were observed; 5) "*Y forms*" in which a concave depression had occurred in the distal loop of the hairpin; 6) "*Horizontal sub-papillary plexus (S.P.P.) forms*" in which remnants of the horizontal plexus persisted; 7) "*Bizarre forms*" in which complex malformations including corkscrew rotations, concertina-like forms, multicupping and other features were seen; 8) "*Haemorrhages*" in which extraversation of blood outside the vessel wall had occurred and resembled stellate or punctate petechial patches adjacent to an often deformed capillary; and 9) "*Tiny immature forms*" in which only the topmost distal portion of the capillary loop was visible.

An indication of some typical examples of these forms and their variations is given in figure 1.

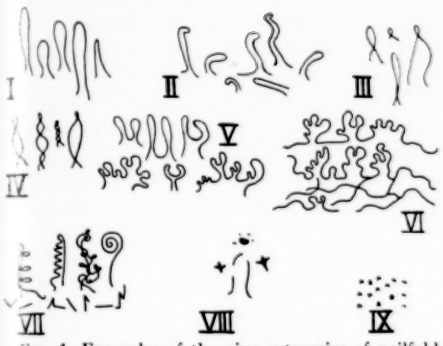

FIG. 1. Examples of the nine categories of nailfold capillary morphological types differentiated along with some of their commonly observed variants. For description see text.

Statistical Procedure and Reliability Study

As has already been mentioned, we were not concerned so much with the total capillary representation in the field under examination as with the relative incidence of each of the nine distinct structural categories listed above, and hence expressing such incidences as percentages of the total capillary saturation per field was considered the best means of evaluating the differential incidence. Diagnostic groups were compared in this way in terms of each of the nine categories and the results subjected to an analysis of variance to determine what proportion of the differences found could be due to chance alone. The investigation of the possible influence of separate hand analysis and of age was treated in a similar fashion.

A good deal of emphasis was given to the reliability study. Not only were all rating counts in the main study made without knowledge of the patients' names or diagnostic grouping but also a separate rating was made of a proportion of the subjects by a second observer. This reliability study was carried out after instructing the observer in the appearance of the nine classifying categories of capillary structure for a period of two weeks. During this time he carried out assessments of capillaroscopic records under supervision, checking his results with those of the writer constantly. When he expressed himself competent in the task, he was given an entirely new set of capillaroscopic records for independent analysis and his assay was handled in the same statistical fashion as was the main body of the results.

The final procedure adopted was to erect a number of hypotheses, deduced as a result of statements in the literature, personal observation and ontogenetic theory and to test them out by the analysis of variance method. One such hypothesis for example assumed that the adult hairpin form is the "normal" form to be found in healthy adults: hence its representation in psychiatrically abnormal groups should not only be lower than in a healthy population but also insignificantly differentiating among such mentally ill groups.

RESULTS

Separate Contributions of the Two Hands

A primary test in evaluating the results appeared to be an assessment of the differential contributions of the two hands to the incidence study. This was approached from two directions, the incidence of adult hairpins, poor hairpins and single twists (i.e., Categories 1–3) in all eight diagnostic groups being chosen for analysis. In procedure A the mean of the sum of the differences between the scores of the two hands of all subjects was compared for significance, using a modification of Student's t test $\left(t = \frac{D\sqrt{N}}{sd}\right)$ separately in each diagnostic group. In no case was it found that t approached statistical significance. In Procedure B analyses of variance were computed on the differences (left minus right) between the scores of the two hands for the eight diagnostic groups in the three capillary categories and the results were found to be similarly statistically insignificant.

The relevance of these analyses was that from now on the necessity for working the figures of each hand separately or of discarding the data of one or other hands was obviated. The scores of the two hands were accordingly combined and the ensuing results computed on the basis of double percentages.

The Incidence of the Nine Categories of Capillaries in the Diagnostic Groups

Category 1: Good Hairpins. An analysis of variance on the summed (left plus right) scores in the eight diagnostic groups was sig-

TABLE 1.—RANKING ORDER FROM LARGEST MEAN (1) TO SMALLEST MEAN (8) OF THE INCIDENCE OF NINE CATEGORIES OF CAPILLARY MORPHOLOGY IN EACH OF EIGHT DIAGNOSTIC GROUPS
Differentiation is statistically significant to at least .01 in all categories save that of poor hairpins (II)

Diagnostic Group	N	Rank Order of the Incidence of the Nine Categories of Capillary Structure								
		I (GH)	II (PH)	III (ST)	IV (DT)	V (Y)	VI (SPP)	VII (Biz)	VIII (Haem)	IX (TI)
Healthy controls	96	1	N.S.	1	8	5	7	7	8	8
Anxiety state	40	5		5	4	6	8	8	7	2
Hysterics	33	4		3	1	2	3	5	5	6
Aggressive psychopaths	14	6		2	3	4	4	4	4	4
Inadequate psychopaths	26	8		4	6	3	2	3	6	5
Depressives	58	2		6	2	8	6	6	3	3
Schizophrenics	50	7		7	5	1	1	2	2	7
Epileptics	15	3		8	7	7	5	1	1	1

nificant at the .1 per cent confidence level (F ratio = 10.717; d.f. = 7 and 324). The ranking order showed that the highest incidence of good hairpin forms occurred in the healthy control group and the lowest in the schizophrenic and inadequate psychopathic groups of psychiatric patients. Table 1 shows the complete rank order of incidence from the largest mean (1) to the smallest (8) in this and also in the other seven Categories of capillary morphology.

Comment. The hairpin has been held by most writers to represent the adult nailfold capillary structure found typically in health. The finding of a significantly differentiating positive incidence in the present investigation affords a satisfactory indication of its validation as compared with previous work. Almost equally important however is the negative incidence of these hairpin forms in such grave psychiatric disturbances as schizophrenia and psychopathic personality both of which exhibit maturational dysplasias in other spheres of reference (25, 26).

Category 2: Poor Hairpins. Here the analysis of variance indicated that the mean score did not differ significantly from one another (F ratio = 1.882; P is N.S.). No precise meaning can therefore be given to the ranking order of the mean scores and these are omitted from table 1.

Category 3: Single Twists. An F ratio of 4.084 was significant at the 1 per cent level and inspection of the ranking order of the scores showed this to be the category also best represented by the control group, though its pattern differed from that of Category 1.

Category 4: Double Twists. The analysis of variance showed this category also to be significantly differentiating, this time at the 1 per cent level, between the diagnostic groups (F ratio = 5.553). At the head of the ranking order with the largest means in this category were the patients with hysteria and affective disorder, depression; least commonly represented were those with epilepsy and the healthy controls.

Comment. In both Categories 3 and 4 the hairpin-type capillary is well formed in so far as its growth is concerned. It has however undergone a twisting, minimal in 3 and maximal in 4, during the course of development and hence must be regarded as a dysplasia rather than a fixation of the growth process. Hauptmann and Myerson (11) first noted the correlation between twisted hairpins and certain forms of neurosis and "manic-depressive insanity." A few single twists can also be seen in Lewis' (1927) illustrations of a "normal" capillary field.

Category 5: Y Forms. The F ratio for this analysis of variance was 3.066 which gave a probability level significant at 1 per cent. The largest means were represented by the schizophrenics, hysterics and inadequate psychopaths; the smallest by the epileptic and depressive patients.

Category 6: Horizontal S.P.P. Forms. The analysis of variance was again significant for this category (F ratio = 6.285; P < .1 per cent) while the ranking order of the means resembled that of Category 5 very closely, the first three places being occupied by the same three psychiatric disorders.

Comment. In both the Y and horizontal subpapillary plexus type of capillary structure a pure fixation at an immature level of development is evidenced. This is less so in the case of the Y form than in the S.P.P. form but in neither case does dysplasia co-exist with impaired growth. The process of ontogenesis from the primitive foetal stromal *Anlage* has proceeded only so far as to determine the beginnings of differentiation and has there ceased.

Category 7: Bizarre Forms. The analysis of variance here was again highly significant (F ratio = 8.852, P < .1 per cent) the largest means being characteristic of epilepsy, schizophrenia and the psychopathies, the smallest being found in the healthy group and anxiety states.

Comment. The bizarre forms represent some degree of morphological immaturity but with, often gross, dysplasia superadded. Such a picture characterizes especially the capillary structure of patients with epilepsy, the deviations of the configuration of which almost justifies a classification of its own. Short, coarse, acute-angled forms, irregular in outline and with none of the flowing lines seen in other disorders, were common among the epileptic patients and seemed somehow typical of the violence of their aggressive personalities. Such characteristics were also seen in lesser degree among the aggressive psychopathic patients.

Category 8: Haemorrhages. The F ratio here was 5.322 which was significant at the .1 per cent level. None of the means approached the values given by the patient with epilepsy, schizophrenia and depression, the incidence of haemorrhages in whom was outstanding.

Comment. Olkon (30) had noted haemorrhages in many of his epileptics and schizophrenics, though Hauptmann and Myerson (11) confessed they had never observed them. It seems strange that this should have been so since rupture of the cerebral capillaries with diapedesis or extravasation of blood outside their walls is a relatively constant finding following convulsions in rabbits (2), in cats (7) and in monkeys (8). Because of this an explanation of the haemorrhages in the patients with depression may readily be seen for many were examined during or after courses of electroconvulsive therapy. In another study (Lovett Doust, 1953, unpublished observations) showers of such haemorrhages have been seen actually appearing in the nail fold area of patients undergoing electroshock treatment.

Category 9: Tiny Immature Forms. The analysis of variance on the incidence of this type of capillary structure in the different diagnostic groups was significant at the 1 per cent level of confidence (F ratio = 3.093). The ranking order indicated that tiny immature forms were commonest in patients with epilepsy, anxiety states, depression and aggressive psychopathy and least common in the control group.

The Influence of Chronological Age

The possible influence of this variable was assessed by computing the incidence of capillary Categories 1 and 2 (i.e., good and poor hairpin forms) in the 96 members of the control group, the records of whom were sorted into five age groups in accordance with the chronological ages of the subjects. Although the mean incidence of these hairpin forms was highest in the younger age groups and tended to fall off as age increased, this trend was not statistically significant when an analysis of variance was applied to the figures (F ratio = 1.429; d.f. = 4 and 91; P is N.S.). It may therefore be concluded that chronological age is not a significant determinant of the incidence of hairpin capillary structure within the age range of 16 to 62 years.

The Reliability of the Results

The method of estimating reliability has already been outlined in a foregoing section. Here it need only be emphasized that the evaluation was made on the capillaroscopic records of a smaller number of subjects than was used in the main study and by a collegue who, once trained in the recognition of the nine categories of nailfold capillary structure, was left entirely alone to make his own analysis of incidence from records which bore no indication of their origin.

A total of 141 records was employed comprising those of 36 healthy controls, 37 psychoneurotics (20 anxiety states and 17 hysterics), 21 patients with psychopathic personality (6 aggressive and 15 inadequate), 20 patients with affective disorder, depression, 18 schizophrenics, and 9 epileptics. The statistical pro-

TABLE 2.—EXTENT OF CORRESPONDENCE WHEN RESULTS OF THE RELIABILITY STUDY OF 141 SUBJECTS ARE COMPARED WITH RESULTS OF PRINCIPAL STUDY ON 332 SUBJECTS

Category of Capillary Structure	Extent of Differentiation Between and among 8 Diagnostic Groups Expressed by Amount of Chance Expectancy after Analysis of Variance	
	Initial study df = 7 and 324 (per cent)	Reliability study df = 7 and 133 (per cent)
I. Good hairpins	0.1	0.1
II. Poor hairpins	N.S.	0.1
III. Single twists	0.1	N.S.
IV. Double twists	0.1	5.0
V. Y forms	1.0	1.0
VI. S.P.P. forms	0.1	5.0
VII. Bizarre forms	0.1	0.1
VIII. Haemorrhages	0.1	1.0
IX. Tiny immature forms	1.0	1.0

cedure resembled that of the main study in all its details. The results are listed in table 2 along with those of the main study and it will be observed that, in most instances, satisfactory agreement between the two analysis was achieved. It was concluded that this reliability study adequately confirmed the results of the main investigation.

The Correlation between Specific Capillary Structure and Psychiatric Diagnosis

The evidence presented thus far has suggested that a definite relationship exists between the morphological features of the nail-fold capillary unit and the occurrence of mental disorder of a definite type. In order to test this statistically, and hence to categorize such relationship with confidence a series of hypotheses was set up and tested. It is important to mention that the hypotheses were deduced from clinical capillaroscopic experience and from a study of the available literature and not from the results of the ensuing analyses. Had the latter procedure been followed the correlations discovered might have been somewhat sharper but the statistical method would have been rendered invalid. The hypotheses and the results of their testing will be mentioned *seriatim:*

1. That no difference of incidence on the summed scores exists in Category 1 (good hairpin forms) among the abnormal psychiatric groups. An analysis of variance on the incidence of good hairpins in the seven groups of patients yielded an F ratio of 1.809 (d.f. 6 and 229) which was not significant. This hypothesis was therefore considered as proven.

2. That the capillary structure of Category 2 (poor hairpins) is characteristic of patients with inadequate psychopathy. An analysis of variance comparing the incidence of poor hairpins in this group of psychiatric patients with that of all other diagnostic groups, including the controls gave an F ratio of 6.942 (d.f. = 1 and 330) which was significant at the 1 per cent level of confidence. Again the hypothesis was considered proved.

3. That capillary hairpins of Category 3 (single twists) are found predominantly in healthy controls and patients with "minor" psychiatric disturbances (such as psychopathic personality and psychoneurosis) while they tend to be uncommon in patients with "major" disturbances such as the psychoses and epilepsy.

This hypothesis was tested by comparing the pooled incidence of single twist forms in the controls, inadequate and aggressive psychopaths, the anxiety states and the hysterics with their incidence in the patients with depression, schizophrenia and epilepsy. Again the hypothesis was confirmed (F ratio = 14.932; d.f. = 1 and 330; $P < .1$ per cent).

4. That the dysplastic but mature capillaries of Category 4 (double twists) characterize patients with affective disorders.

The test here consisted of comparing the incidence in all other groups including the controls. The hypothesis was proven (F ratio = 8.301; d.f. = 1 and 330; P = 1 per cent).

5. That the immature Y shaped capillaries of Category 5 are most common in patients with the hysterical variety of psychoneurosis, in inadequate psychopaths and in schizophrenics.

The combined incidence of Category 5 capillary structure in these patients was compared with that in all five diagnostic groups. The findings supported the hypothesis (F ratio = 13.653; d.f. = 1 and 330; $P < .1$ per cent).

6. That immature capillaries belonging to Category 6 (horizontal sub-papillary plexus forms) characterize patients with hysteria.

inadequate psychopathy and schizophrenia. An analysis of variance supported this hypothesis also (F ratio = 28.625; d.f. = 1 and 330; P < .1 per cent).

7. That the combination of dysplasia and immaturity represented by the "bizarre" capillaries of Category 7 are seen typically in the disorders of schizophrenia and epilepsy. Comparing their incidence in these two patient groups with that in the controls, neurotics, psychopaths and depressives, confirmation of this hypothesis was obtained (F ratio = 47.905; d.f. = 1 and 330; P < .1 per cent).

8. That the spontaneous convulsive activity seen in idiopathic epileptic patients and the similar response induced in depressed patients as a result of therapeutic electroshock is associated with an increased incidence of capillary haemorrhages (Category 8). This hypothesis also received support from a suitably applied analysis of variance (F ratio = 14.528; d.f. = 1 and P < .1 per cent).

9. That the type of immature capillary structure typified by Category 9 (tiny immature forms) represents an aberrant development of the path of capillary maturation along which Categories 5 and 6 are fixations.

To test this hypothesis the diagnostic groups of affective disorder, depression, and psychoneurosis, anxiety state, were initially separated from the remainder and the two pooled sets of records of incidence compared with each other by an analysis of variance. The combined means of these groups were found significantly to differ from one another at the .1 per cent level (F ratio = 13.722; d.f. = 1 and 330). As a further check on the subsidiary hypothesis, dependent on the interpretation of Hypothesis 9, that the psychiatric state of depression not only is essentially different from the maturational pathway along which schizophreniform and hysteroid reactions represent typical fixations, but also may be differentiated from this type of development capillaroscopically a second statistical device was employed. In this test the pooled incidence of tiny immature forms in the two psychopathic groups was compared with that in all other groups. Here the F ratio was found to be 0.138 which with 1 and 330 degrees of freedom yields a probability level too great for significance.

Comment

As a result of the testing of these hypotheses a fairly definite pattern of nailfold skin capillary structure may be assigned with some confidence to such psychiatric diagnostic groups as have been included in this investigation. Thus mental health and emotional stability are associated with a high proportion of good hairpins and similarly psychiatric disorder and instability of any type with a low incidence of these capillary forms of Category 1. Mental health is also consistent with a fair admixture of the single twisted loops of Category 3. Conversely, psychiatric disturbance in its milder forms is characterized positively by the presence of the capillary anomalies of Categories 3, 4 and 5, and in its major forms by Categories 6, 7, 8 and 9. The detailed classification correlating the different morphological types with the healthy controls and patients with seven psychiatric disorders is given in table 3.

The technique of capillary microscopy appears to possess therefore a diagnostic value for the presence of mental disorder in the affected patient. Without undue speculation this constitutional investigation may be assumed to have a predictive value also, since capillary structure does not change overnight (save in the most exceptional circumstances, e.g. Julianelle and Bishop (16)). The apparently healthy individual with a relatively heavy loading of Categories to 5 to 7 type capillaries may not only be assumed to break down psychiatrically more readily under stress than the individual with few of these forms and a high proportion of Category 1 capillaries, but also it may be presumed that, when the breakdown occurs, it will assume the cloak of a schizophreniform illness.

A second corollary of the findings would appear similarly probable. The personality of man is no ideal norm however closely it may apparently approach it. Rather it is a mosaic, a jigsaw of opposing traits and tendencies, a recipe compounded of the resultants of genetic endowment and the ebb and flow of environmental forces, frustrated impulses, social pressures, and the like. And it is relevant that such resultants, save in certain cases of identical twins, produce an individual unique among his fellows with a bearing and temperament,

TABLE 3.—Association between Specific Capillary Structure and Psychiatric Diagnosis
For description of the nine structural categories see text and figure 1

Diagnostic Group	Characterizing Categories of Capillary Structure	
	Specifically present	Specifically absent
Healthy controls	I, III	IV, VI, VII, VIII, IX
Anxiety states	III, IX	VI, VII, VIII
Hysterics	IV, V, VI	IX
Aggressive psychopaths	III	—
Inadequate psychopaths	II, V, VI	I
Depressives	IV, VIII, IX	V
Schizophrenics	V, VI, VII, VIII	I, III, IX
Epileptics	VII, VIII, IX	III, IV, V

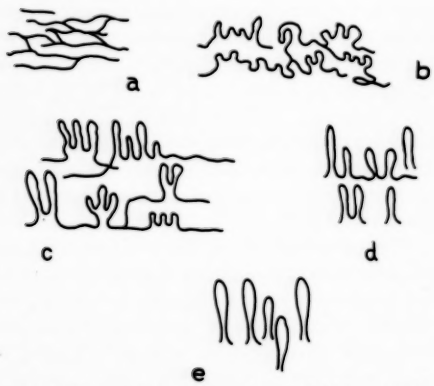

Fig. 2. Progressive ontogenesis of nailfold capillaries from the undifferentiated vascular stromal mass of *a* to the fully developed adult forms of *e*. Note the similarities especially between the stages of *b*, *c* and *d* and some of the morphological Categories associated with predisposition to mental disorder (fig. 1).

a physical appearance, a set of finger prints—in a word, a personality, possessed by no one else. The nailfold capillaries of adult man have been stated to be as characteristically individual as his face (4) and it would appear very probable that the potential psychiatric significance attaching to the structural anomalies as revealed in this investigation is also as telling evidence of elements of the psychopathology of their owners. It is already known that a positive correlation exists between the constitutional somatotype and the nailfold capillary structure (11, 19) and there is an abundant literature linking such biotypology with the emotional functioning of the personality (17, 37, 38). Our present inference is a further confirmation of these studies and perhaps takes them a little further in both a qualitative and a quantitative way.

A final implication of the current findings concerns the concept of ontogenesis in relation to personality and to psychiatry. As has already been stated, evidence is accumulating which suggests that patients with mental disorders can be regarded as representing an arrest at both physical and emotional levels of integration along the path of development, with an increased tendency toward differential maturational dysplasia at points characteristic for the disorder from which they are suffering.

A study of the structural capillary anomalies exemplified in figure 1 reveals a close connection between many of those forms found typically in psychiatric patients and forms intermediate in the developmental process of normal maturation. Jaensch (15), Wittneben (46) and others have demonstrated the gradual evolution of the good hairpin loop (Category 1) from the structureless, undifferentiated, stromal vascular *Anlage* (fig. 2a) the evolution continuing for some 1 to 8 years (34). Budding of capillary sprouts from this stromal mass occurs first but is often preceded by showers of petechial haemorrhages (16). The buds form from the branching of a progressively more distinct horizontal series of vessels, several sprouts appearing visually from the same stem (fig. 2b). The buds and branches then form themselves into more or less distinct rows and individual loops begin to appear, though these are still joined to the horizontal, or sub-papillary plexus, of vessels and to each other (fig. 2c). This plexus disappears from view, the loops become discrete from one or another and elongate to form the adult hairpins (fig. 2d). The correspondence between the stages in this differentiation and the capillary structure of Category 1, 5, 7, 8 and 9 can

readily be seen since such "abnormal" capillary formations represent nothing more than simple fixations of the developmental process at one or other of the various stages of growth. Categories 2, 3, 4 and 7 are merely examples of dysplasia occurring in the setting of this ontogenetic pattern, the deviations taking place at various times during the growth process.

It has been seen already that one advantage of the nine-category classification offered by this investigation is that it provides an objective method of correlating capillary morphology with personality structure and psychiatric disorder. Another advantage is that it permits such personality differentials and mental disturbances to be viewed as examples of constitutionally arrested and deviated development and thus at once brings the vasculature into line with other ontogenetically determined dysplasias of the personality and provides an index for treatment prognosis in patients with psychiatric disturbances. For, if capillary growth has apparently ceased and such cessation is associated with liability to breakdown, reenhancement of such growth may be a goal to strive for in therapy and capillary microscopy an index of its successful achievement.

Summary

1. Drawings and photomicrographs of the capillary structure of the nailfold skin of the ring fingers of both hands were examined in 332 subjects. Of these, 96 were healthy controls, 40 were psychiatric patients with psychopathic personality, 73 patients with psychoneurosis, 15 patients with epilepsy, 58 patients with depression and 50 were patients with schizophrenia.

2. Nine distinct Categories of capillary structure are distinguished as representing stages in capillary maturation or dysplasia of the growth process. The incidence of each Category in eight diagnostic groups is evaluated and the results subjected to analyses of variance to assess their significance.

3. It was found that no significant differences existed between the records of the two hands and that age, within the range of 18 to 58 years, could be discounted as a variable.

4. Specific patterns of nailfold capillary structure were found to characterize the healthy subjects and patients with each of seven varieties of psychiatric disturbance. The results possessed statistical validity and a supplementary analysis by a second observer yielded adequate reliability.

5. It is inferred from the results that the nailfold capillary morphology is indicative of personality structure, liability to psychiatric breakdown and that it represents an index of constitutional maturation.

I am greatly indebted for the co-operation I have received from friends and colleagues who referred patients to me for study; and to Dr. Robert A. Schneider of the Department of Medicine, University of Oklahoma Medical School, Oklahoma, U. S. A., who very kindly undertook the reliability study analysis for me.

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REHABILITATION OF NEGRO POST-LEUKOTOMY PATIENTS[1]

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The purpose of this study is to review the post-leukotomy rehabilitation program at the Veterans Administration Hospital, Tuskegee, Alabama, to critically evaluate and compare it with similar programs published in the literature, and to note those cultural, social, and economic problems peculiar to the rehabilitation of the Negro leukotomized veteran.

Historical

Apparently the beginning of surgical treatment for psychiatric disorders is lost in antiquity. There is much evidence that in the dawn of history man associated disordered thinking and bizarre behavior with abnormal conditions within the skull. Holes were burred or cut in the calvarium to allow the escape of "devils," "demons," "spirits," etc. The 2,000-year-old skulls of the Peruvian Indians of South America showed evidence of surgical procedures. A pioneer in modern psychosurgery was Gottlieb Burckhardt, a Swiss surgeon, who performed his first operation on the intact brain for the relief of mental symptoms in 1890. The Russian surgeon, Puusepp, performed psychosurgery on three manic-depressive psychotics to relieve their mental symptoms. Present-day psychosurgery dates from the Portuguese neuropsychiatrist Egas Moniz who, in 1935, with the help of his associate Almeida Lima, began a series of psychosurgical operations. Freeman and Watts in 1936 performed the first lobotomy operation in the United States. Subsequently, numerous psychosurgical procedures by many neurosurgeons have been developed and tried on human beings. The Lyerly "Open" Operation is the most widely used in the United States (1).

There is much to indicate that the clinical results of these psychosurgical procedures are due to the interruption of appropriate thalamic radiations that mediate emotionally charged psychic phenomena.

Indications and Sequelae

Reports in the literature for the most part indicate that the workers in the field of psychosurgery are in general agreement that the best results are obtained in the psychoneurotic dsiorders with obsessive-compulsive or hypochondriacal symptomatology and in the affective psychoses of the involutional and manic-depressive reaction types. The next best results are reported in the paranoid type of schizophrenic reaction without hallucinations and the catatonic and undifferentiated types of schizophrenia. The chronic manic reaction type of manic-depressive psychosis and the hebephrenic type of schizophrenic reaction are least benefited.

Workers report that relief is obtained in the following states: indecisiveness; depersonalization; blockage of thought and some perplexed anxiety with vague dreamy states; lack of initiative and progressive withdrawal; depressive states; relief of pain where fear of pain evokes a greater emotional disturbance than the pain itself; obsessive-compulsive states with severe anxiety and rumination; certain florid schizophrenic reactions with acute hallucinations, delusions, and heightened affect; long-standing violent conduct disturbances related to increased emotional tension; some aggressive psychopaths, encephalitics, epileptics, and mental defectives; post-encephalitic Parkinsonism; hypochondriasis; intractable psychosomatic conditions; agitated depression; and impulsivity. It is controversial whether relief is obtained in the following states; excitement; restlessness; aggressiveness; agitated pictures with marked tension; tension; lack of initiative and ability to form object relationships; and decreased capacity to work and get along. There is general agreement that the following features are resistant to improvement by psychosurgical procedures: lack of interest; underactivity; inappropriate affect; withdrawal; disorientation; chronic hallucinations; and

[1] Reviewed in the Veterans Administration and published with the approval of the Medical Director. The statements and conclusions published by the author are the results of his own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

alcoholism. Favorable prognostic factors are reported as follows: youth; a well-balanced prepsychotic personality; an acute onset; and a short (6 months to 1 year) duration of illness. Significant sequelae reported by workers in the field are: convulsive seizures; inertia; urinary frequency, urgency and occasional incontinence; aggressiveness; excessive weight gain; loss of emotional warmth; worsening of symptoms; disappearance or reduction of sexual potency; increased irritability; and lack of consideration for others.

Description of Program

This program was begun in June, 1950. The "total push" theory of Myerson is the philosophy behind our rehabilitation program, and the collective approach is used to effect the desired objectives of resocialization, reeducation, learning new skills, vocational adjustment, the development of hobby and activity interest, the learning of acceptable expressions of aggression, and to effect the definitive objective of restoring the patient to an adequate level of socio-economic functioning. A com-

TABLE 1.—Activity Program for Post-Leukotomy Patients—Sept. 1953

Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
a.m. 6:00	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene
7:00	Morning meal						
8:00	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene
9:00	Church service	CT	CT	CT	CT	CT	Chaplain visit
10:00	Gym., R-1 Music 16	Library	OT	OT	OT	OT	Gym., R-1 Room 16
11:00	Music lounge	Sports	Bus ride	Sports	Bus ride	Sports	Bicycle riding
12:00	Noon meal						
p.m. 1:00	Canteen	ET	ET	ET	ET	ET	Movie
2:00	Music hour Base. #68	Music hour Base. #68	Group therapy	Librarian visit	Music hour Base. #68	Music hour Base. #68	Ward G-2
3:00	Music hour Base. #68	Music hour Base. #68	Music hour Base. #68	Music lounge			Library
4:00	Evening meal						
5:00	Recreation room	Recreation room	Recreation room	Recreation room	Recreation room	Recreation room	Recreation room
6:00–8:00	Chaplaincy services	Movies	Special services	Movies	Special services	Special services	Movies
9:00	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene	Personal hygiene
10:00	Bed	Bed	Bed	Bed	Bed	Bed	Bed

promise objective is a better hospital adjustment. The patient's own previous personality structure, dynamics, and behavior are used as controls.

The leukotomized patients assigned to the program are housed together on a wing of the first floor of the Neurology Building, having their own dayroom and solarium. All ward routine activities, such as personal hygiene and eating, are participated in as a supervised group with individual attention as indicated. The activity program fills in the hours from 6:00 a.m. to 10:00 p.m. daily, including Sunday, and is considered a unit of treatment (table 1). The patients attend these activities as a group. The exceptions are the ground-privilege patients who use certain hours as the canteen hour, music hour, etc., as they see fit. Several hospital services participate in the activity program, which is coordinated and scheduled so that the patients move from one set of activities to another in a normal manner such as real life situations demand of them.

Statistical Evaluation

This study is on 71 chronic, psychotic, Negro patients who received prefrontal leukotomies, all of which were performed by Dr. Stanley Graham at this hospital between June 16, 1950, and March 9, 1954. Sixty-nine of these patients carried schizophrenic reaction diagnoses, which included one simple type (fig. 1), 7 hebephrenic type, 22 catatonic type, 26 paranoid type, and 12 undifferentiated type. Of the other 2, 1 carried a diagnosis of epilepsy, grand mal type with psychotic behavior, and the other carried a diagnosis of manic depressive reaction, manic type. One patient was a female with a diagnosis of schizophrenic reaction, paranoid type.

The duration of mental illness before the operation ranged from 2 to 9 years, with an average of 7 years. The age range at the date of operation was from 25 to 50 years, with an average of 33.9 years (fig. 1).

Because of the questionable objectivity in evaluation techniques used and lack of agreement by the workers in the field on the variables to be used, the number of variables will be limited to five—those that are markedly improved, moderately improved, slightly improved, unimproved, and those who died. The criteria for the several categories are as follows: markedly improved includes all those who are

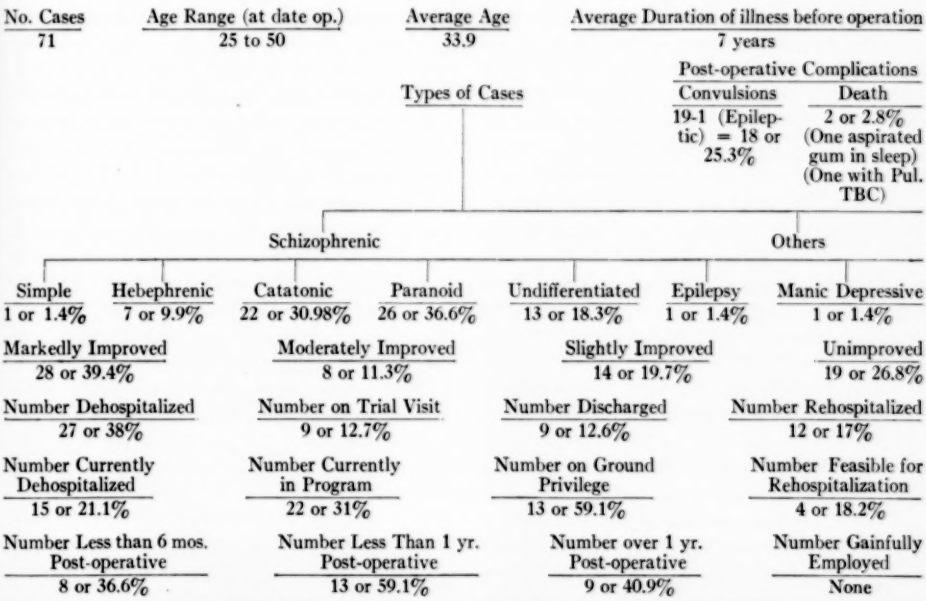

Fig. 1. Current (3/31/54) evaluation of post-leukotomy rehabilitation program

TABLE 2.—Correlation of Results with Diagnosis

Diagnosis	No. of Pts.	Improvement				Unimproved	Relapse	Death
		Marked	Moderate	Slight	Total			
		%	%	%	%	%	%	%
Schizophrenia, simple	1			100	100			
Schizophrenia, hebephrenic	7	57.1		14.3	71.4	28.6	75	
Schizophrenia, catatonic	22	45.5	9.1	40.9	95.5		40	4.5
Schizophrenia, paranoid	26	42.3	15.4	23.1	80.8	19.2	15.4	
Schizophrenia, undifferentiated	12	25.0	8.3	41.7	75.0	25	16.7	8.3
Epilepsy	1					100		
Manic-depressive	1					100		

considered eligible for dehospitalization (home situations and lack of sufficient funds have precluded dehospitalization in some cases); moderately improved includes those who have adjusted satisfactorily to ground privileges but are not feasible for dehospitalization; slightly improved includes those who have made a better hospital (closed ward) adjustment but are not feasible for ground privileges or dehospitalization; and those unimproved are those who require housing on a maximum security (greatly disturbed) ward; the category of death is self-explanatory and does not refer to surgical deaths. The category of relapse is not considered in the variables but refers to all patients who were dehospitalized and subsequently rehospitalized.

Of the 7 patients receiving the bilateral prefrontal leukotomy operation (fig. 1), 28 (39.4 per cent) were markedly improved; 8 (11.3 per cent) were moderately improved; 14 (19.7 per cent) were slightly improved; 19 (26.8 per cent) were unimproved; and 2 (2.4 per cent) died (one about 24 weeks post-operative by aspirating chewing gum during his sleep, and the other about 26 months post-operative of pulmonary tuberculosis); 27 (38 per cent) have been dehospitalized; 9 (12.6 per cent) have been discharged; 9 (12.6 per cent) are on trial visit; 12 (17 per cent) have been rehospitalized; 15 (21.1 per cent) are currently dehospitalized; 22 (31 per cent) are currently in the program, of these 13 (59.1 per cent) are on ground privileges, 4 (18.2 per cent) are feasible for dehospitalization (environmental and financial factors preclude their dehospitalization); 8 (36.6 per cent) of these are less than 6 months post-operative; 13 (59.1 per cent) are less than 1 year post-operative; 9 (40.9 per cent) are over 1 year post-operative. None of the dehospitalized patients has been gainfully employed; 18 (25.3 per cent) have had post-operative convulsions. The epileptic continued to have convulsions post-operatively.

When they are correlated with the diagnoses, the following results are of significance (table 2): Schizophrenic reaction types—simple type, 1 per cent showed slight improvement; hebephrenic type, 57.1 per cent showed marked improvement, 14.3 per cent slight improvement, for a total of 71.4 per cent improved, 8.6 per cent were unimproved and 75 per cent of the markedly improved had relapses; catatonic type, 45.5 per cent showed marked improvement, 9.1 per cent showed moderate improvement, 40.9 per cent showed slight improvement, for a total of 95.5 per cent improved, 4.5 per cent died (one who aspirated gum), 40 per cent of the markedly improved had relapses, and none of the catatonics was unimproved; paranoid type, 42.3 per cent showed marked improvement, 15.4 per cent showed moderate improvement, 23.1 per cent showed slight improvement, for a total of 80.8 per cent improved, 19.2 per cent unimproved, and 15.4 per cent of the markedly improved had relapses; undifferentiated type, 25.0 per cent showed marked improvement, 8.3 per cent showed moderate improvement, 41.7 per cent showed slight improvement, for a total of 75.0 per cent improved, 25 per cent unimproved, 16.7 per cent of the markedly improved had relapses, and 8.3 per cent died; both the manic and the epileptic were unimproved.

Discussion

Comparative statistics show (table 3) our percentage, 39.4 per cent of markedly improved, to be considerably below that of the Connecticut study of 57.8 per cent, but signifi-

TABLE 3.—Comparative Statistics

Name of Hosp.	No. of Pts.	Improvement				Unimproved	Dehospitalized		Rehospitalized	Convulsions	Death
		Marked	Moderate	Slight	Total		T.V.	Disch.			
		%	%	%	%	%	%	%	%	%	%
Pilgrim State Hosp., W. Brentwood, N. Y.	600				67	33		28 (168 pts.)		5 (overall) 15 (in older cases)	7 (42 pts.)
Connecticut Cooperative Laboratory Study	254	57.8		24.8	82.6	13.4				7.8 (at 6 mos.) 9.8 (at 1 yr.) 12.3 (end 2 yrs.)	3.9
VA Hosp., Northport, L. I., N. Y.	62				85	15	19.3	16.1	3.2	19.4	
Delaware State Hospital	71	26.8	39.5		66.3	33.71		26.8	41	7	12.7
VA Hosp., Tuskegee, Alabama, 1954	71	39.4	11.3	19.7	70.4	26.8	38.0	8.5	17	25.3	2.8

cantly above Delaware's of 26.8 per cent; our 70.4 per cent of total improvement is significantly below the 85 per cent reported by the Veterans Administration Hospital, Northport (4), and the Connecticut report of 82.6 per cent, but slightly above the Pilgrim State Hospital report of 67 per cent and Delaware's report of 66.3 per cent; our 26.8 per cent unimproved is significantly higher than the Northport report of 15 per cent and the Connecticut report of 13.4 per cent and slightly lower than Delaware's report of 33.71 per cent, but significantly lower than the Pilgrim State Hospital report of 67 per cent; our 38 per cent dehospitalized is significantly higher than Pilgrim State's report of 28 per cent and compares favorably with Northport's 35.4 per cent, considerably below Delaware's 41 per cent, but our 17 per cent rehospitalization is much higher than Northport's 3.2 per cent. Klotz, Ritchie, and Schiele, in their study of 100 patients at the Veterans Administration Hospital, St. Cloud, Minnesota (28), report 81 per cent improved and 19 per cent unimproved. These varying results in improvement, unimprovement, and rehospitalizations reflect the varying criteria used by the different workers in the field and point up the need for some standard objective methodology for evaluation. However, it is significant to note that all workers report a very high percentage of improvement and dehospitalization of chronically ill mental patients in view of the fact that only about 10 per cent are dehospitalized, when other forms of therapy are used.

Comparative studies based on diagnostic categories reveal that our 71.4 per cent improvement in hebephrenics is considerably above the Connecticut figure of 42.9 per cent, the St. Cloud V.A. figure of 23 per cent, and Delaware's 18 per cent; our 95.5 per cent improvement in catatonics is also much larger than Connecticut's 56.8 per cent, Delaware's 34 per cent, and St. Cloud's 10 per cent; our improvement of paranoids is considerably higher than St. Cloud's 24 per cent, Delaware's 41 per cent, and significantly higher than Connecticut's 69.4 per cent; our 75 per cent improvement in the undifferentiated type is significantly lower than Connecticut's 84.6 per cent but very much higher than St. Cloud's 7 per cent; our 1 per cent in the simple type is exactly the same as St. Cloud's but significantly lower than Connecticut's 14.3 per cent. Here again a lack of uniform yardstick is evident, but significant initial improvement is noted in paranoid, catatonic, and undifferentiated types of schizophrenia. Our 0 per

cent improvement in the manic type of manic-depressive reaction is not significant since we had only one, but St. Cloud reports 3 per cent improved and Delaware the very high figure of about 51 per cent in "affective psychosis." Stevenson and McCausland (45) of London, Ontario, Canada, report "favorable effects" in manic-depressive illnesses. St. Cloud reports 2 per cent improvement in deteriorated epileptics compared with our 0 per cent in the one case.

The very large percentages of relapses, especially in the hebephrenics (75 per cent) (Delaware reports no relapses in the hebephrenics but only about 18 per cent improvement. This would compare favorably with our 14.3 per cent sustained improvement in this group) and the catatonics (40 per cent) (Delaware reports about 11 per cent relapses but only about 24 per cent improvement in the catatonics, which again compares favorably with our 27.3 per cent sustained improvement in this group), are suggestive of something other than unfavorable environmental factors and indicate critical evaluation at a later date. The correspondingly low percentages of relapses in the paranoids (15.4 per cent) (Delaware's 11 per cent) and undifferentiated type (16.7 per cent) are suggestive of good remissions in these schizophrenic types, and also indicate critical evaluation.

18.2 per cent of the current leukotomized patients are eligible for discharge, but this is precluded by environmental and financial factors.

The relatively high percentage, 25.3 per cent of convulsive seizures, as compared with 19.4 per cent at Northport, 12.3 per cent both in the Connecticut study and Freeman and Watts' study, 7 per cent at Delaware and 5 per cent at the Pilgrim State Hospital, was of particular concern. A breakdown of the incidence of seizures by the year reveals that in the first year (June 16, 1950 to May 18, 1951) 8 out of 19 or 42.1 per cent had seizures; for the second year (July 16, 1951 to August 15, 1952) 6 out of 22 or 27.2 per cent had seizures; for the third year (August 29, 1952 to August 14, 1953) 5 out of 17 or 29.4 per cent had seizures; and that in the last 7 months, none of the patients has had seizures. The question is certainly posed as to whether this high incidence of seizures is in any way related to the high incidence of excessive scar (keloid) formation in Negroes (2).

An estimated 10 to 15 per cent of leukotomized patients develop this complication. Various etiological factors have been postulated; preceding organic brain disease, operative and post-operative hemorrhage, infection and length of follow-up period; increased physiologic reactivity to epinephrine and carotid sinus stimulation; special liability of schizophrenic patients, convulsant medication, post-operative courses of electroconvulsive treatment, deterioration, pre-operative isolated attacks and sex; the "dysrhythmogenic effect of brain cutting," older age, pre-operative brain damage, extensive surgical procedures, especially the type involving extensive cortical damage, posterior sections, post-operative complications such as meningitis and more than one operation.

Summary

A review of a rehabilitation program for leukotomized Negro patients was presented, critically evaluated, and compared with similar programs published in the literature, and future studies and changes in the program indicated.

Seventy-one leukotomized chronically ill Negro mental patients were exposed to the "total push" type of rehabilitation program with application of the team concept, and the resultant findings are consistant with other programs reported in the literature in that a significant number of patients were improved by psychosurgery followed by intensive rehabilitation efforts.

A very high percentage (75 per cent) of relapses in the hebephrenic type of schizophrenic reaction and significant percentage (40 per cent) of the catatonic type were noted, and at the other extreme of relapses were the paranoid type with 15.4 per cent and the undifferentiated with 16.7 per cent relapses. These findings are consistent with reports of others and are in the need of critical evaluation with special attention to social and environmental factors that may have precipitated the returns to the hospital; thus the Social Service Department will figure significantly in this study.

A very high percentage (25.3 per cent) overall and a high of 42.1 per cent for the first year of leukotomy induced seizure occurred. This needs critical evaluation and may have some correlation to the predisposition to keloid formation in Negroes.

Except for one who has been recently reported as working part-time, none is gainfully employed. One is making definitive plans for resuming his educational pursuits. Twenty-one per cent are currently making a marginal social adjustment outside of the hospital.

Conclusions

1. Our improved and dehospitalized cases compare favorably with others reported in the literature.

2. There is need for a critical evaluation of the high incidence of convulsive seizures in this as well as in other series reported by various authors.

3. There is a significant need for environmental manipulation, critical evaluation of adjustment problems outside the hospital, and better orientation of significant people in the dehospitalized leukotomy patient's environment.

4. A uniform and rigid set of criteria for selections of candidates, ways to evaluate these criteria more objectively, and adequate controls are needed for a more critical evaluation of this and other post-leukotomy rehabilitation programs.

5. A more scientific approach to the problems of disorganized complexity (variables) in psychiatry is most certainly needed.

6. The cultural, social, and economic factors peculiar to the southern Negro have not been singularly significant in their rehabilitation.

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REVERSAL OF EVOLUTION IN INSULIN COMA

Via Mortis Remensa Via

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The induction of hypoglycemic coma by means of insulin has for many years been the established treatment of the mental disease known as schizophrenia. Very briefly, it consists in giving to the patient every weekday over a period of months a sufficient dose of insulin to produce coma, each coma being terminated after the lapse of some hours by the administration of glucose either by stomach tube or by intravenous injection. This means that the patient is brought daily into the borderland of death before being revived, and very occasionally he fails to return. One aspect of the treatment is that it affords the physician an unrivalled opportunity of studying the processes of dis-integration and re-integration of the nervous system as consciousness gives place to coma and vice versa. Although the reduction of nervous and mental functioning is brought about primarily by a diminished supply of glucose to the brain, the intimate nature of the mechanism is not understood; it may well be that the symptoms are not specific for hypoglycemia, but represent the general march of events which results from the action of a number of noxious agents upon the nervous system. This gives the subject an added interest.

The following study is based on observations made on a hundred patients who were undergoing deep insulin therapy, and extended over a period of five years. Although the patients were all suffering from mental illness, the reader may rest assured that neither the abnormal behavior nor the strange ideas to be discussed had anything to do with the patients' symptoms in the waking state. They were manifested for the first time in connection with insulin coma and did not occur apart from this.

Neurological Observations

No attempt will be made to describe in detail the clinical picture presented by a patient who is on his way into hypoglycemic coma. Broadly speaking, two stages are passed through once the treatment has become fully established: first, a stage of somnolence and inertia, and second, a stage of hyperkinesis. The hyperkinetic stage can be further subdivided into a stage of restlessness and one of convulsive or spasmodic movement. These stages are not clearly defined but are liable to encroach upon each other, and the period of restlessness is often omitted. While passing through them the patient may exhibit neurological signs indicative of release from higher control of lower nervous elements, e.g., forced grasping, extensor plantar response, Magnus and de Kleijn reflexes, generalized extensor spasms with attendant decerebrate posture; and at least two authors (9) have classified the symptoms under such headings as cerebral, subcortical, midbrain and medullary. Furthermore, it is well recognized that on their way into coma patients are liable to manifest sucking movements, babyish speech, rolling of the head and other actions which are strongly reminiscent of the nursery. It is, therefore, already tacitly, if not openly, admitted that a reversal of nervous evolution takes place in insulin coma. Our interest here lies in the motor phenomena of the dissolution as viewed from the broad standpoint of Hughlings Jackson's teaching, supplemented by additional knowledge derived from modern embryological research.

Hughlings Jackson, who was greatly influenced by the views of Herbert Spencer, maintained that many of the symptoms of nervous disease could be explained on the basis of a reversal of evolution. This process, which he called dissolution, involved a reduction from the most voluntary, most complex, least organized nervous functions towards those which were most automatic, most simple and most organized. It will be of interest, therefore, to examine from this angle the behavior of the insulin patient as he proceeds on his daily journey to and from the precincts of death. In doing so a further theory of Hughlings Jackson's relating to epilepsy must be borne

in mind, because, although we are not studying epilepsy, we shall have to take note of convulsive phenomena, viz., clonic and tonic spasms. Jackson (8) held that an epileptic fit was nothing else than a sudden, excessive and rapid development of the patient's *normal* movements, which by operating contemporaneously lost their individuality. He pointed out that the fit may involve in this way any of the patient's commonplace daily movements, e.g.: movements of the eyes in looking; of the face in its various expressions; articulatory movements. He goes on to say: "But from such developments (in the fit) there is no looking, smiling, talking, etc., because all the movements which are developed, being nearly contemporaneously developed, are 'run up' into a muscular fight." Put briefly, Jackson regarded an epileptic fit as a "clotted mass of movements." With this illuminating theory in mind we can turn to the motor manifestations of insulin coma.

Among the earliest symptoms of hypoglycemia are a feeling of weakness and a reluctance to make any mental or physical effort. The patient lies quietly in bed in a sleepy state. He can move perfectly well if he wants to, but he prefers not to do so. At first one might be inclined to dismiss this feeling of weakness lightly as being due to interference with the carbohydrate metabolism of the muscles. But the stage of inertia is often succeeded by a stage of intense muscular activity, during which the patient behaves most violently, flinging himself about, shouting, and performing all sorts of antics which would be quite impossible if there were any inherent weakness of the muscles. How can this apparent contradiction be explained? The answer seems to be that the feeling of weakness arises from impairment of *willed* movements, and is identical with the inertia described by the physiologist Barcroft (1) as occurring in people who are suffering from oxygen deprivation. The individual can move with an effort, but there is a disinclination to do so. It is really a form of paralysis due to impairment of the most recently evolved elements of the brain.

There are two pieces of evidence which support this view. In the first place, the stage of restlessness or excessive movement which follows the stage of weakness is sometimes remembered by the patient on recovering from coma, and he will then say that he did not mean to throw himself about in this violent way, but that he could not help it. One man said: "Yes, I do know I am doing it. I don't know why I do it. I don't think I have any object. I can't stop it." Another said: "It was madness. I hadn't control of my senses. I knew what was happening but could not control my actions. I could not stop doing these acts of madness. There was no object or reason in the actions." Other patients tell a similar story. Clearly, this violent behavior is involuntary, which suggests that the previous stage of weakness and inertia was due to commencing failure of *voluntary* movement. The second point is that the patient passes through a similar stage of "weakness" just after regaining consciousness on recovering from coma, i.e., when re-integration is nearing completion. Now, however, he spontaneously associates his weakness with interference with volition. Here are some of the statements made about this second stage of weakness retrospectively:

L. H. said: "It's more inertia than weakness. You feel disinclined to move yourself until somebody else gets you started. You just let things happen".

W. D. said: "I was paralyzed. I couldn't move and my mind couldn't focus. *I couldn't understand how to move my arms.* I couldn't control my limbs to exercise them."

B. C. said: "I couldn't use the towel (to wipe the sweat off his body). *My mind was too weak to make my hands do it*".

A. T. S. said: "*No part of your body is responsive to your brain*" (i.e., when coming round).

J. T. said: "You try and put your pajamas on, but you can't do it. *You know what you want to do, but you can't do it.* Just when I am coming to I have no control over what I say. I know what I am saying, but I can't stop myself".

A. J. A. said: "I feel like an automaton (i.e., when coming round). *I haven't got control over my body.* I want to do things, but can't get a grip on myself." When asked to give a definition of an automaton, the patient replied, "A sort of mechanism that does things not of its own will, but of the will of others."

A. G. said: "I feel weak and can't find the strength to raise myself up or put anything on (i.e., to change his pajamas). *It seems as if I haven't got the nerve control.*"

E. G. H. said: "When you wake up you feel weak and can't move. You would like to sit up, but you can't; you haven't got the energy."

R. H. D. said: "I still feel very weak coming round. The first thing I notice is that the nurse is trying to get me to sit up. I find it very hard to move."

A. N. said: "It seems a very long time before I can

really start to move my limbs. *It's as though my body does not respond to the will that I want to move.* I often feel it's about time I sat up, and that's as far as I can go; I continue to lie there. *It's as though there is no contact between my mind and my limbs*".

D. D. said: "Coming round you are paralyzed. You can't move your legs or your limbs. *Your mind can't control your limbs—your mind is not there.* You can see your arms, but you can't move them".

T. F. said: "When the nurse tells me to sit up *I have no will of my own.* I can't move my legs; they seem paralyzed." On another occasion he said: "It's an effort to move at first. *I feel my mind is gradually waking up* and it is a terrific effort to lift up my arm, or to try and sit up in bed." And on another occasion: "When they tell me to sit up I *haven't got the will power.* I want to do it, but my brain does not seem to function."

Such remarks, which are quite usual, seem to show that the weakness experienced during recovery from insulin coma is due to paralysis of willed movements, and it is probable that the early pre-coma weakness arises in the same way. Patients on recovering from coma have usually only the vaguest recollection of what they have felt like when "going off," whereas if questioned about the initial weakness when they are actually experiencing it, they appear to be unable to analyze it owing to inertia. On the exceptional occasions when I have been able to obtain any information about it the patient's description has tallied with that given of the weakness felt during recovery. From this, and from the fact that the initial weakness is followed by involuntary behavior, it seems permissible to conclude that both pre- and post-coma weakness are due to paralysis of willed movements, and that in insulin coma nervous dissolution and re-evolution proceed from the voluntary to the automatic and vice versa as Hughlings Jackson suggests.

And now to consider the next stage of insulin coma, the stage of hyperkinesis. As already stated, this can be subdivided into a stage of restlessness and one of spasmodic movement, but they are likely to merge into each other, and the period of restlessness may be omitted. Speaking generally, the restless movements may be described as random, impulsive, unnatural and largely purposeless. On closer analysis they present the following characteristics: Firstly, they are involuntary, according to the testimony of those who remember them afterwards. Secondly, they are massive, and involve large areas of the musculature. Thus, trunk movement is very much to the fore, and is accompaneid by movements of the head and limbs. The patient twists and turns in bed, flexes and extends his trunk, grimaces, shouts, and flings his limbs violently about. Much of the body is in movement at the same time, and movement at the more centrally placed joints—those of the hips, shoulders and spinal column—tends to predominate. The arm is inclined to be waved about in one piece in the fully extended position, as if it had no segments. The hands, which at first execute strong grasping movements, are used less and less for prehension as the stage advances. Localized movement appears to be giving place to mass movement. This de-differentiation of movement is particularly well shown in the realm of speech, for words can no longer be formulated and are replaced by long drawn out wails, cries and noises, involving gross movements of the vocal apparatus. The third characteristic of the restless behavior is that the movements tend to develop suddenly and excessively. That is to say, they lack normal grading. This makes them very difficult to deal with, and it is not always possible to prevent the patient from accidentally injuring himself or those around him. Thus, he may fling out an arm or leg, or bang his head against the bed-rail, so suddenly that nothing can be done to parry the blow. Indeed, many a boxer would be envious of the speed with which such movements are executed. The fourth and last characteristic of the restless behavior is that the movements tend to be repeated, or to *persist* in the form of a grotesque posture. In other words, variety of movement is giving place to stereotypy. To summarize the restless stage: the movements are involuntary, generalized rather than local, prone to develop rapidly, and liable to be repeated. They lack the smooth coordination of voluntary movements, but they still retain a good deal of coordination.

Sooner or later in every case of insulin coma of sufficient depth convulsive movements make their appearance, and they often encroach on the previous stage of restlessness. At first, they may be either clonic or tonic, but in deep coma the spasms are always tonic. The clonic movements may begin as mere twitchings of a few small muscles, e.g., at the angle of the mouth, but before long they involve large

areas of the musculature. Thus, the head, trunk and one or both arms may give a violent jerk together. The jerks are sometimes repeated in a brief rhythm—hence the term clonic—but isolated jerks are common. They are very like the starts given by normal persons at the sudden banging of a door. They lack every trace of coordination, but like their predecessors the restless movements, they are involuntary, involve large areas of the musculature, and tend to be repeated. An important difference between the two types of movement is that the process of grading, which was already impaired during the restless stage, has now become totally abolished.

The tonic spasms, like the clonic, may at first be purely local and confined to the muscles of a single joint. Thus, an elbow may be maintained in spastic flexion, or a shoulder in adduction. In advanced coma, however, the tonic spasms are generalized in distribution and extensor in type. At this stage powerful extensor spasms repeatedly sweep over the body and for a few seconds maintain the extremities in log-like extension, the back in hyper-extension, and the head in retraction, the whole posture resembling that which follows decerebration. Here again, however, the spasms have something in common with the previous movements in so far as they involve large areas of the musculature, and are repeated at intervals. At this point all variety of movement has been abolished, and the individual is capable only of adopting a stereotyped posture.

What I have been trying to suggest in the foregoing brief description of the motor manifestations of insulin coma is that as nervous dissolution proceeds there is a progressive de-differentiation of movement, associated with a development of *mass* movement. What Hughlings Jackson calls "harmony and melody of movement" are gradually abolished, and in the end there are only spasms. For instance, during the restless stage which follows the disappearance of willed movements many parts of the body are in motion at the same time, or in quick succession, but at this stage the individual parts retain their independence. Thus, while the trunk is being rotated, extended or flexed, the legs may be kicked about, the arms flung out, and the head turned repeatedly from side to side. During the succeeding clonic spasms, however, this independence of movement is abolished, and a number of parts, e.g., head, arm and trunk, combine to give a single jerk. This appears to be due to a progressive *unification* of movement in time and space. Successive and simultaneous movements run into each other, and are condensed into one gross undifferentiated movement. The process of fusion is carried still further in the stage of tonic extensor spasm, for now, as in the tonic stage of an epileptic fit, agonists and antagonists contract together, and movement is only rendered possible by the dominance of one group of muscles over its opponent.

It would be a mistake, therefore, to regard the restless and the convulsive movements as two totally different classes of movement since, apart from the tendency towards repetition and persistence exhibited by both, they appear to reflect in different degree a single underlying mechanism, viz., that of fusion. Indeed, if the observer is lucky he may occasionally witness the transition of one type of movement into the other. Thus, a movement which has been begun with a degree of coordination may end up as a jerk, or a coordinated movement in a given direction may be succeeded by a jerk in the same direction. But such demonstrations are rare.

The disappearance of local movement and its replacement by mass movement during the course of insulin coma implies increased irradiation of nervous impulse, since so many muscles are contracting at the same time, including antagonistic muscles. The existence of such enhanced nervous irradiation can be demonstrated easily in the sphere of reflex activity. If at a certain stage of coma a tendon reflex be stimulated, it will be evident that more muscles than those normally involved in the reflex participate in the response, so that parts of the body remote from the stimulated area move. Take for example the knee jerk. On the way into coma there is a stage when not only is this exaggerated, and often sustained, but the reaction involves the extensor muscles of the hip as well, so that the whole leg is reflexly pressed down upon the bed when the patellar tendon is struck. Furthermore, the reaction may spread to the other leg, so that the latter gives a jerk synchronously with the stimulated leg. Again, in this phase of height-

ened reflex excitability it sometimes happens that if the abdominal muscles are lightly tapped with a patellar hammer not only do they themselves contract, but one or both legs give a jerk at the same time. This also holds good for the arm reflexes, where again the response tends to involve muscles additional to those which normally participate in a given reflex. In more advanced coma, during the extensor spasm stage, nervous irradiation becomes still more marked, and a tap on the patellar tendon may then evoke a mass extensor spasm of the whole body.

There is another reflex phenomenon in insulin coma which shows this progressive spread of nervous impulse in response to a given stimulus. I refer to the eye-blink reflex. This reflex can be elicited in normal people in a number of different ways. Thus, a touch on the cornea, conjunctiva or eyelids, any sudden unexpected sound, a bright light flashed into the eye, or an object brought into the field of vision in close proximity to the eye, will evoke bilateral closure of the lids. Yet another type of stimulus, which is said to produce a blink in normal persons, is a tap on the nose or temporal region. I quote Wartenberg (10) for this, but I must say that in my experience it is a most inconstant phenomenon in normal people. The case is, however, quite different in insulin coma. At a relatively early stage of coma a bilateral blink response can usually be obtained by tapping lightly with a patella hammer any part of the head. Occasionally it may even be induced by touching the skin of the face or forehead with a wisp of wool, but the best way to elicit it is by a definite tap. As coma deepens, the range of muscles involved in this reflex extends, so that a tap on the head produces not only a bilateral blink, but a jerk of the head, shoulders and arms as well. What was originaly a discrete response becomes, as coma proceeds, a mass response. It is interesting to recall that in normal persons a flash of light or a noise, if sufficiently unexpected, may produce a jerk of the head and body as well as a blink, a manifestation not unlike the reaction I have been describing. In insulin coma, however, when a tap on the head causes a blink plus a jerk of the head and arms, only in the most exceptional cases will a motor horn sounded close to the ear, or a bright light flashed into the eye, cause even a blink. It would appear that as the distance receptors are thrown out of action in insulin coma so does the head become more responsive to direct stimulation, albeit to stimulation of a particular kind; viz., tapping. I want to make one point quite clear, however: the blink plus jerk reaction cannot be obtained in the more advanced stages of insulin coma. It invariably dies out with the onset of extensor spasms.

We have already seen that the nervous dissolution of insulin coma follows Hughlings Jackson's teaching in so far as there is a reduction from the voluntary to the involuntary, from the complex to the simple, and from the highly differentiated to the less differentiated. Variety of movement gives place to monotonous repetition and, in the language of Herbert Spencer, heterogeneity gives place to homogeneity. But the fact that during this reversal of evolution localized movement is replaced by mass movement coupled with enhanced nervous irradiation invites a further interpretation. This arises from the laboratory work of Coghill and others on the development of behavior in the embryo. Coghill (3) made an exhaustive study of the genesis of behavior in Amblystoma, and from this was led to believe that the organism was integrated as a whole from the beginning, and that the earliest form of behavior was "total" in character. From this "total pattern" of behavior localized reactions became segregated out as development proceeded. He described how in Amblystoma the earliest movements of the gills, fore-limbs, and hind-limbs were performed only in conjunction with the trunk, and how the acquisition of independence by these appendages was a later accomplishment. Coghill considered his findings equally applicable to the human fetus. He says (1929b): "I am convinced by a study of all available records of movements of human fetuses of the first six months that behavior develops in man as it does in Amblystoma, by the expansion of a total pattern which is integrated as a whole from the beginning and by individuation of partial patterns (reflexes) within the unitary whole." Thus, according to Coghill, the development of reflexes is an analytic process, and to him they are not the fundamental units of behavior. A number of distinguished investigators in the

field of fetal behavior have found evidence which supports Coghill's theory, notably Barcroft and Barron (2) in England, and Hooker (6) in America. Minkowski, one of the greatest authorities on movements in the human fetus, did not subscribe to Coghill's views, but is reported by Irwin (1932) as having found in human fetuses considerable irradiation of nervous impulse. He observed no isolated reflexes which were localized at the segments stimulated; on the contrary, reactions from local stimulation tended to irradiate over the whole body (as they do in insulin coma). This finding of Minkowski's would seem to imply mass activity. Mass activity has also been found by many competent observers to be a characteristic of early post-natal life. Irwin (7), in the course of an excellent review of the subject, says: "Differentiation and specificity of behavior in infants, therefore, probably develop out of an original matrix of mass activity; mass activity probably is the earliest activity of the uterine organism."

From all this it seems justifiable to conclude that in the dissolution of insulin coma there is not only a "taking to pieces" of the nervous system, according to the general principles laid down by Hughlings Jackson, but in addition a reversion of nervous functioning to the level of the fetus and newborn infant.

Psychological Observations

We now come to the psychological side of the subject. Are these physical happenings accompanied by any mental happenings which might have a bearing on the question of nervous dissolution and re-evolution? Psychoanalysts have long taken the view that in all forms of shock therapy the patient regresses to infancy, and undergoes what they call "rebirth," but psychoanalytic reasoning is not easy to follow, and it will be more impressive if we can find evidence from other sources. Let me say at once that it is very difficult to ascertain what patients are thinking about in insulin coma; during coma they are, of course, inaccessible to questioning, and after recovery they have usually a complete amnesia for all that has occurred. Many patients are aware that they have had experiences, but they cannot recollect them. Such amnesias are prone to follow any state of disordered consciousness, even that associated with normal sleep, and under such circumstances people find great difficulty in remembering afterwards what they have been thinking about. Fortunately, however, the amnesia associated with insulin coma is not always complete, and a number of patients can give a vivid account of their experiences upon awakening. While the majority of these remember the ordeal solely as a struggle against impending death, some are more concerned with the period of recovery or, in our own terms, with the period of re-evolution. Thus, 15 out of the 100 patients under review recounted experiences based on one of the following themes: (a) being born again, (b) being babies again, (c) evolving again. I propose to relate these experiences in the actual words used by the patients, as this will be more convincing, but the reader will have to put up with bad grammar, peculiar modes of expression, and occasional ambiguity of meaning. These drawbacks will be more than offset by the advantage of reading a completely valid record. Again I must emphasize the fact that the experiences had nothing to do with the patients' mental symptoms. They arose as a direct result of insulin coma, and did not occur apart from this.

Case 1. N. B., aged 28, who possessed no psychoanalytic knowledge whatever, said that each time he came out of coma he felt "re-born," and as though he was starting life afresh. His actual words were: "*I feel as though I am re-born every day;* starting with a clean sheet." He also remarked: "It's like waking up in an entirely fresh world with a complete blank behind you. You have no recollection of any past events at the time, and you are starting completely afresh. You cannot remember anything of your past life." On another occasion he described his experience as "A sense of starting all over again; as if there was not any past at all."

Case 2. P. C., aged 21, also had the experience of being "re-born." His words were: "*You feel as if you had just been re-born.*" On another occasion he said: "Waking up it's as if you had not been alive before; as if you were seeing things for the first time; as if you had been asleep for a long time. Your mind is a blank when you wake up, and *you are just feeling you way into the world physically.*"

Case 3. A. T. S., aged 34, said: "You can liken it (i.e., the period of recovery) *to a child being born,* if a child could think. It's like being dumbfounded." When asked in what way it was like a child being born, patient said: "In as much as the patient is looking at his counterpart; there is no feeling attached to it. It is different from anything I have experienced before. I know myself to be alive, yet *I can't reach anyone with my brain, and they can't reach me with theirs.*"

Case 4. F. D. G., aged 28, said that on recovery from coma he felt "grand" and *"just like as if I had been born."*

Case 5. J. R. M., aged 20, gave this description of his experience: "Just out of the world. I do not know what I am. I think I am a bit of an object, and they are pulling me out of a shell. *I felt I was being born all over again* . . . I was straining for my life to live. I thought I was being *made* again; as if they were making something new."

Case 6. J. H., aged 27, said: "Coming out (of coma) it *seems as if I am being re-born again;* coming into a different world. I seem to know the place, and yet it seems strange."

Case 7. D. M. G., aged 25, said: "It is the strangest feeling imaginable. *It feels as if you had just been born.*"

Case 8. E. H., aged 21, said: "It was a queer feeling coming round. You don't know where you are; whether in this world or not. It seems as if it is a new world to you. You don't seem to know your own self. You think: is it really me? You wonder are you alive. Everything seems so strange at first." On another occasion he said: *"It's just like starting a new life.* Everything seems new to you. You can't seem to remember anything, and then it gradually comes back. You see things, and know what they are, but in yourself *you seem to be new.*"

Case 9. R. F. H., aged 23, said: "I retraced my footsteps back through life. *I went back to infancy.*"

Case 10. A. V., aged 42, describing what he felt like coming out of coma, said: "It's just *as if I had a baby's mind.* Like a long time ago. As if I was coming out of a long dream; a dream of years ago."

Case 11. D. J. B., aged 22, said: "*You feel like a baby;* you can't move. I've seen babies put their fingers in their mouths, and you feel like that."

Case 12. G. S., aged 27, who was the father of a baby ten months old, said: "On Wednesday (coming out of coma) I got the impression I was my own child. As if *I was being compressed into my own baby, and was answering as a baby would.* It was as though I had got within the spirit of my own child."

Case 13. F. W., aged 25, said: "I seemed to be half my normal size, and felt as though my body was growing and getting bigger. My legs were stretching down farther and other parts of my body were expanding; getting bigger. Then the movements of my body got stronger. I felt my muscles getting bigger. I could see and feel the hairs on my legs growing as I was coming more and more to myself. At the beginning (referring to the stage when he felt small) *I seemed huddled up in a heap like a baby or a young child.*"

Case 14. J. R. G., aged 31, said: "The experience I have had has been right back before I was born. You have the experience of being out of space, of just existing. You feel that you exist, that you are yourself, but that you haven't been born yet. Then one or two mornings I had a strange experience like watching the cells of a human being starting to form. *Then I passed through experiences which must be like those I underwent when I was being born.* I usually have had these experiences at the time they are trying to bring me to."

Reviewing this group, we find that 13 out of the 100 patients had the experience either of being born again, or of having become babies again. Statistically, this is not an impressive figure, especially when it has to be admitted that many of the patients underwent the experience on only a single occasion. On the other hand, it must not be forgotten that after most insulin comas the patient can remember nothing at all. What seems to invest the experience with importance is its strange, almost unique, character, as well as the conditions under which it arose. Does any normal person ever dream of being re-born? The word "re-birth" occurs frequently in psychoanalytic literature, but, so far as I can judge, it is used in a metaphorical sense, whereas in the present instance most of the patients felt they were being reborn, or had become babies again, as a concrete reality. Moreover, it surely cannot be fortuitous that the experience coincided with a reduction of nervous functioning to a primitive level, or, as I have tried to argue, with the re-awakening of the nervous organization of the fetus and infant. It would seem that significance must be attached to it, and that it should be regarded as in some way related to the events which were taking place within the nervous system. It is important to note that in several instances amplifications were given which were quite consistent with a brain operating at an infantile level. Thus, one man (Case 2) said he felt that he was seeing things for the first time; another (Case 1) that he was starting life afresh; while a third (Case 3) complained: "I can't reach anyone with my brain, and they can't reach me with theirs."

Cases 13 and 14 had the additional experience of growing or evolving. The following are two more cases which illustrate the same thing:

Case 15. P. M. T., aged 18, said of his experience under insulin: "It's like the forming of matter; like elemental creation. The main theme through all your experience is the struggle for life; to form something out of nothing . . . . Have you heard of the ameba? It's like the experience of an ameba, a simple cell reproducing and absorbing food. It is only faced with one thing: the struggle for life. It has not got any thoughts, and it is a very simple organism. Under insulin it is like that: *the forming of life.* I can't think myself, but am more like an ameba; shunted about. Every impression has a thousand implications; the very highest sensitivity to natural phenomena. If you are moved to one position you have a thousand thoughts of your sensibility. *As if you were yourself conscious of the act of creation. You are just being given those characteristics which make your individuality.* I suppose you would call it your soul." On

another occasion this patient said of his experience coming out of coma: "It was just like elements fusing together and forming, and that sort of thing. *It was like the very beginning of yourself; as if you were in the stage of creation, and coming into being.*"

Case 16. J. McF., aged 26, said: "I was drifting in what seemed to be outer space, or outer darkness, for everything was misty, giving no real impression save one of emptiness. Suddenly I was fighting my way out of a jelly-like substance, fighting because long, sinuous, tendril-like arms were holding me back. I shook off the arms, and evolved into a shape not unlike a crab, but with the distinction of not having any claws or arms. I still had to fight out of my container, for somehow I had to reach a stage of evolution in which I had to use my not yet grown limbs. This time more and more arms held me back, and it was with a terrific effort I loosed myself and found I now had arms and legs, but in no way could I make them carry me upwards, upwards as I now realized, to reason and to a coordination of mind and muscle. And so the fight went on, each fight harder than the previous one, *until I found I had traversed through every possible phase of existence from protoplasm right to the embryo stage of a normal human being.* This stage was the most terrifying. *I fought my way out of what I supposed was a woman's womb* into a nightmare of abnormalities. *Here, every phase of my real life flashed before me.* I had a sense of watching myself live from outside myself in a world apart from this one, and yet clearly allied to it in that everything had already happened in this our world. I again started to fight, and gradually, very gradually, I fought my way back into my own bed, slipping back again and fighting my way through to this world again and again,[1] until eventually I awoke, as still in a dream, to see the striped pads around my bed, and the nurse enquiring as to how I felt; to which I gave reply with some profanity, proving conclusively that at last I had fought my way into my own existence in my own world."

Let us reflect for a moment on these four cases (Nos. 13, 14, 15 and 16) in which the patients felt they were growing or evolving. Again, we are dealing with small numbers, but again the experiences must be almost unique. F. W., Case 13, felt that he was half his normal size, and was rapidly growing. Like Alice in Wonderland his legs began to stretch down farther, and his body to expand, as he proceeded towards recovery. Can this be totally unrelated to the re-integration that was taking place within the nervous system?

Cases 14, 15, and 16 are still more remarkable, for here the patients are concerned with the period before birth, and even with the dawn of life. Thus J. R. G. (Case 14) felt he hadn't been born yet, and that he was watching the cells of a human being starting to form. Again, P. M. T. (Case 15) felt he was "in the stage of creation" and "like an ameba," while J. McF. (Case 16) "traversed through every possible phase of existence from protoplasm right to the embryo stage of a normal human being." Now, of course, these three patients must have had some previous knowledge of the facts of evolution and biological development, but the interesting point is that they should have utilized this knowledge at the time they did in the way they did. What they had been told or had read about evolution came back to their minds when their nervous systems were undergoing re-evolution after having been reduced to a lower level of functional organization during insulin coma, and this knowledge was transformed into a personal experience, i.e., they were the individuals who were undergoing evolution.

A very interesting point about these experiences is that the "I" of the patient, whatever that may be, remains a detached observer of what the rest of the Self is doing. It is very like what we are told takes place during the process of drowning when, under the influence of asphyxia, the whole of the individual's past life is supposed to pass before him. Viewed from a strictly materialistic standpoint, it is difficult to understand why this should be so, because from this angle the "I" should participate in the general dissolution. Yet, in the evolution experiences the "I" is there in the background all the time, and apparently intact.

Some patients, while not having birth experiences, re-live during coma some episode of their past life. This too is in harmony with what is alleged to be taking place in the nervous system: with the reactivation of ontogenetically earlier dispositions there is a re-awakening of earlier experiences.

Case 17. L. P., aged 23, said: "My thoughts ran back over childhood situations. One, two, three layers or fragments of my life came to the surface of my mind, and were almost re-enacted."

Case 18. C. W., aged 26, said: "All my past thoughts and actions seem (under insulin) to flash across my mind; different places I've visited, different atmospheres of places, different incidents."

[1] It is interesting to note in this connection that the process of passing into and out of coma is not continuous, but is liable to fluctuation. A patient may lose consciousness and recover it again several times before finally sinking into coma. Similarly, during recovery he may half wake and then relapse into coma before permanently coming to.

Case 19. D. W. J., aged 27, said: "My past seems to come in front of me; things that have happened right back to my boyhood. I can see them and re-live them."

Case 20. E. L. C., aged 23, said: "I went into a sort of dream. Felt I was somewhere else. Not here. In completely different circumstances. Dreams such as that I was way back at school, or in the Navy (in which he had served during the war) or even that I was not even a human being. You long to get back to normal."

Case 21. D. L. D., aged 28, said: "Once (coming out of coma) I thought I was back at school; about 11 years of age."

Case 22. M. O. H., aged 23, said: "Under insulin today my thoughts went back to a scene in the garden of one of my mother's friends in Nottingham. My brother George and I were playing with the son of my mother's friend. He had a small car, which was pushed along by pedals from the driving seat. We did not use the pedals; either George or the friend sat in the seat while the other two pushed. In time I got rather fed up with pushing, and said that I wanted a ride. George seemed to object to this, and wouldn't let me get in the seat. Hearing the noise my mother came out of the house and told me that George must ride. I refused to push any more, and sulked. I felt that it was always the same with all the toys, George gets preference. Later, we go into the house for tea. I am placed in a baby's chair, but I still continue to sulk and eat little tea. George seems to be a problem I can find no answer for. In all this (under insulin) I saw the three of us playing, and saw our actions, *but my thoughts as a child seemed to have been conveyed to me.* I don't know what age I would be, perhaps under six." On being questioned further about this experience, the patient made it clear that it had been something more than a mere recollection; he had to a certain extent re-lived under insulin this scene of his childhood.

Should this paper be read by a neurologist, he will at once be struck by the similarity between some of these experiences and the feeling of "reminiscence" aroused in certain epileptics immediately before a fit. Hughlings Jackson gives some interesting examples of such auras. One of his patients, a female epileptic, said: "It seemed as if I went back to all that occurred in my childhood; as if I see everything, but so quick and soon gone that I cannot describe it." Another patient describing his fit said: "It begins by a sort of referring to old things; things that have happened." A third said: "Old scenes revert for hours before the fit." A fourth of Jackson's patients said that his fits were preceded by "a peculiar train of ideas as of reminiscence of a former life, or rather, perhaps, of a former psychologic state." These are very like the experiences of the insulin patients, and when it is recalled that they too manifest convulsive phenomena, the suspicion is aroused that insulin coma is nothing else but a long-drawn-out epileptic fit; an instance of "extended epilepsy" (5). But that is another story.

Conclusion

In the foregoing pages certain motor and mental manifestations of therapeutic insulin coma have been considered. On the physical side these reveal a progressive degradation of movement as the patient sinks into coma. Voluntary movement becomes impaired first, and is regained with conscious difficulty on recovery. Following its disappearance a period of hyperkinesis sets in, which may begin as violent restlessness but always ends in convulsive spasms. It is claimed that during this transition Hughlings Jackson's principles of nervous dissolution are fulfilled, in so far as there is a reduction from the voluntary to the involuntary, from the complex to the simple, and from the highly differentiated and various to the less differentiated and stereotyped. But as coma proceeds localized movements are replaced by mass movement, coupled with increased nervous irradiation. This is interpreted as reflecting a reduction of nervous functioning to the level of the fetus and newly born.

Investigation on the psychological side is hampered by the fact that after most comas the patient has an amnesia for all he has experienced. Moreover, many of those who remember anything are only aware of having had a struggle against death. However, 22 out of the 100 patients under review remembered having had experiences based on one of the following themes: (a) re-living some episode of their past life, (b) starting life afresh, (c) being babies again, (d) being born again, (e) evolving again. It is claimed that a parallelism exists between these experiences and the changes of functional organization which were concomitantly taking place within the nervous system. As nervous functioning sinks to an ontogenetically earlier level in hypoglycemia, so does the mind tend to recapture earlier experience, and to focus its phantasies on the beginnings of life. In this movement towards death under insulin there is an apparent mental and physical reversal of life's journey, culminating in a point where birth and death appear to meet.

Truly, may it be said of insulin coma that "the road to death is a road already travelled."

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MEDICAL AND HEALTH DEPT.
BERMUDA

LONG RANGE TREATMENT OF MULTIPLE SCLEROSIS WITH PANCORPHEN

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A scientific evaluation of therapeutic results in multiple sclerosis (M.S.) presents a notoriously difficult problem which is still awaiting a satisfactory solution. This is true for short-range and even more so for long-range treatment. Cases reexamined in detail at short intervals and treated intermittently over periods of years are so rare in the literature that the publication of even a few such cases seems justified. It might be interesting also to compare these data with a previous publication by this author of 140 cases treated with only a single series of the same compound, Pancorphen (2–6).

Pancorphen (P.C.P.) is a heart muscle extract digested with a pancreas extract; phenol is added for both sterility and therapeutic effect. The treatment is characterized by outspoken focal neurologic reactions with very weak general systemic reactions. It has been tried by the author in the course of 25 years on several hundred cases. It is given mostly intravenously in series of five injections. The rationale is still open to speculation. Among the clinical effects vasodilation is an outstanding phenomenon. For details see the main publication (5).

Because of the dearth of scientific criteria we were usually compelled to construct our own controls and quantitative data for evaluation of therapeutic results (2, 3, 4, 5, 6). In addition to standard figures thus obtained we shall use in this article a new quantitative method by Alexander (1). Alexander tries to put the symptoms on a point basis and uses a weighted scale with emphasis on practical clinical results. This can be presented graphically. Despite overemphasis on what we call "practical improvement" (3) we find this system useful, some minor objections notwithstanding (too low appreciation of sensory disturbances, etc.). We shall speak briefly in the following of "Alexander Points" (fig. 1).

First we are bringing brief abstracts of four voluminous case histories. The diagnosis has been confirmed in every case by a number of neurologists in private practice and in other hospitals. The first 3 cases were observed by me at the Goldwater Memorial Hospital, the fourth at Montefiore Hospital and in my office.

Case 1. Josephine W., 24-year-old female. Remitting type. Treatment with P.C.P. started in the seventh year of illness and in a fresh but rather acute and active attack. It continued through the following 4 years. She has been given a total of 12 series of Pancorphen, each series consisting of five intravenous injections (fig. 1). A few of the series had to be interrupted because of intercurrent upper respiratory infections or of cystitis.

Patient has had the typical clinical *reactions* to almost every injection. Samples of these are: retention of stool and urine for 2 days after the first doses (this happened repeatedly); fatigue; sleepiness; increased spasticity; numbness or paraesthesias of extremities; urinary urgency; dyspnoea and difficulties of deglutition; lower back pain; pain in the left leg; toothache; headache; fasciculation of the orbitalis oculi muscle; marked dilatation of one pupil; weakness of convergence; increased paresis; increased clumsiness of one hand; perspiration; warmth; flushing. All these symptoms definitely exceeded any spontaneous fluctuations which we observed in the patient. They lasted hours or several days. They could mostly be corroborated by objective findings like increased spasticity, marked spreading of sensory disturbances, etc. Since the patient kept a diary, some of the reactions could be followed in her hand-writing. There were at times so called "negative" reactions (5) i.e., brief transitory *improvements* of spasticity, paresis, etc. after single injections. Sometimes prolonged reactions occurred, lasting ten to fourteen days and necessitating a few calcium injections for their control.

At the time of the first treatment this patient was completely bedridden. She had

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nystagmus; bi-temporal pallor of the discs; eye muscle paresis; nasal speech; weakness of the palate; moderate euphoric dementia; moderate paresis and hypodiadochokinesis of the upper extremities with hypotonia and hyperactive reflexes. Abdominal reflexes were absent. There was severe spastic paresis of the lower extremities with cloni, pyramidal signs, etc. There were dissociated sensory disturbances in both hands for pain and vibration, less so for touch and temperature from the fourth thoracic segment down.

The *course* of disease before and during the period of P.C.P. injections can also be seen from figure 2. It was a constant struggle against new and acute recurrences of the disease of such rapidly progressive type that there is no doubt in our mind that we have stopped this progression quickly (mostly within one to three weeks) in many instances. The worst relapse occurred at a time when we had no Pancorphen available during a new attack (see fig. 1).

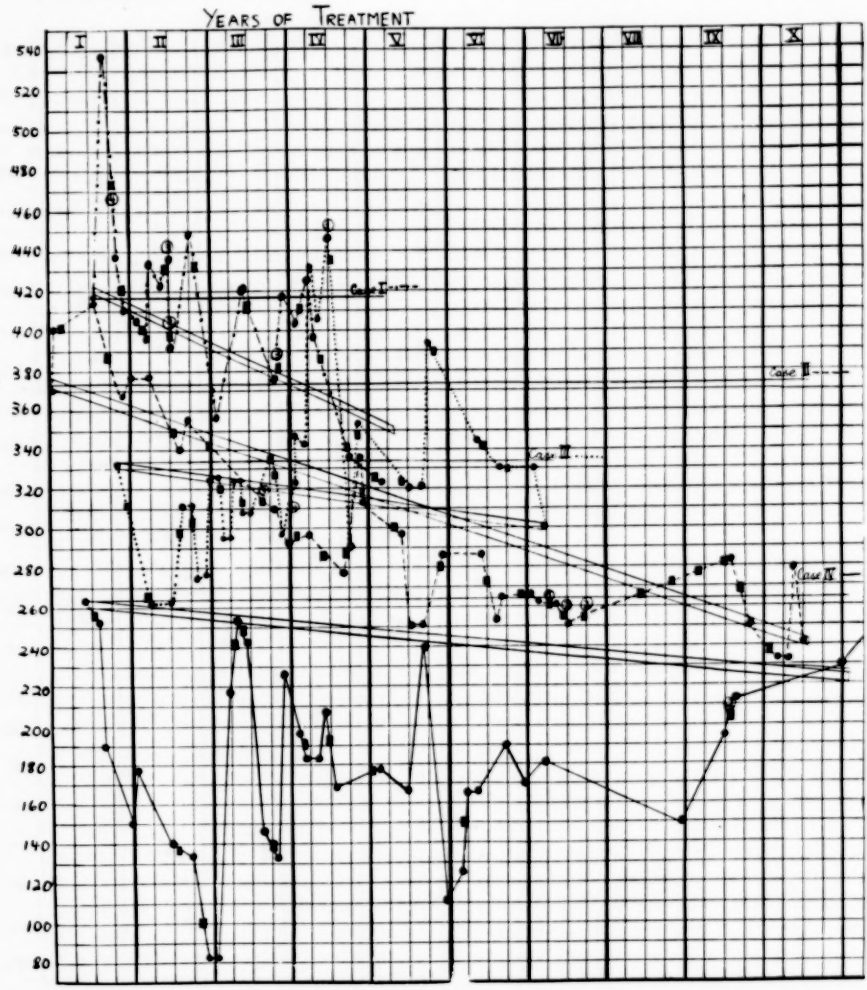

FIG. 1. Course of illness in relation to treatment. Abscissa: number of Alexander points; ordinate: years of treatment (one square: 3 months). Solid black points: point value on the Alexander scale. Solid squares: one series of 5 injections (where fewer injections were given, this is indicated by the encircled figure above the square). Double line: general trend of illness (difference between the first and last examination).

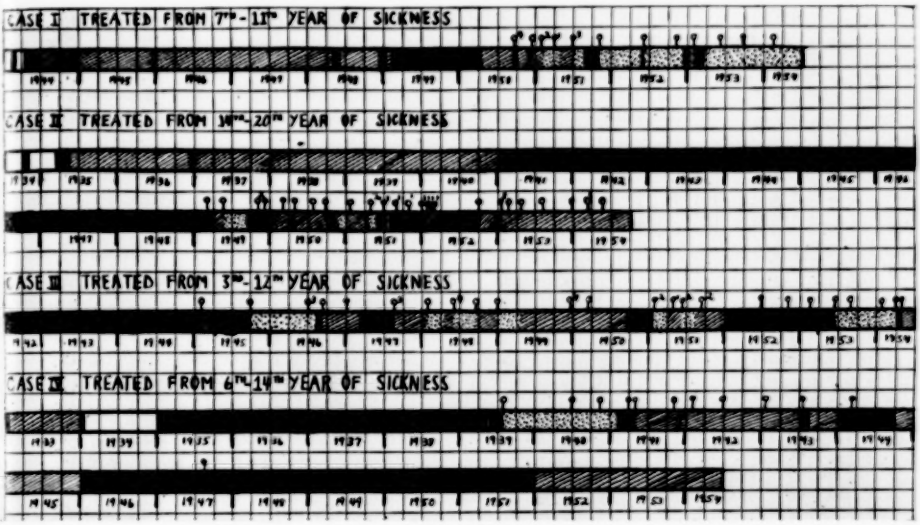
CASE I TREATED FROM 7TH - 11TH YEAR OF SICKNESS
CASE II TREATED FROM 18TH - 20TH YEAR OF SICKNESS
CASE III TREATED FROM 3RD - 12TH YEAR OF SICKNESS
CASE IV TREATED FROM 6TH - 14TH YEAR OF SICKNESS

FIG. 2. Course of illness before, during, and after the treatment. Small circles: one series of 5 injections (where fewer injections were given, see figure above this circle). White areas: complete remissions; striped areas: partial remissions: stippled areas: progressive remissions. Light black areas: stationary attack; dark black: progressive attacks. One square: 3 months.

At the end of the four years of treatment during which she went through a number of relapses (see fig. 2) her psyche was unchanged; cranial nerves normal; upper extremities improved; abdominals unchanged; area and intensity of sensory disturbances definitely diminished; spasticity of the legs changing (in general better); paresis of many muscles slightly improved.

This is not a spectacular improvement compared with her admission. It becomes more impressive if we consider the extent and intensity of some of her later attacks.

Case 2. Joseph S. was 56 years old at the start of the P.C.P. treatment. At that time he was in the fourteenth year of his disease and in the eighth year of a still progressive attack. He was treated between the fourteenth and twentieth year of his illness and received 22 series of P.C.P.—as a rule 5 injections per series; 10 of these series consisted of only 1 to 3 injections. He was a mentally normal, intelligent man who kept an excellent diary in which he described his subjective impressions; these were corroborated by frequent objective examinations.

His *reactions* were less outspoken and more stereotyped than in the more active and younger Case No. 1. He reacted mostly with flushes, feverish feeling, burning eyes, and fatigue; lightness or heaviness combined with "focal" symptoms like numbness; paraesthesia; visual disturbances; intention tremor; increased spasticity; dizziness. Predominant were transitory "negative" reactions: increased strength; lessening of spasticity and of ataxia, etc.

The symptoms at the start of the treatment were: bitemporal pallor; hyperactive jaw jerk; slightly spastic, paretic and atactic upper extremities with slight intention tremor; hyperactive reflexes; right Hofmann and hypodiadochokinesis; partly absent abdominal, absent cremasteric reflexes. He could walk with the help of one cane, dragging his feet in a spastic manner. Spasticity was much more marked on the right side with cloni and pyramidal signs. Paresis was considerable: he could raise the right leg up to 60°, left up to 10°. There was positive Romberg. Sensation was diminished for all superficial modalities over the right trunk and leg and the left fingers and toes.

As can be seen from figure 1 this patient in the 7 years of his treatment manifested 10 new attacks of illness which were followed by prompt, obviously therapeutic, remissions. The attacks consisted mostly of new symptoms

of sensory or motor character. At the end of the observation period (which was concluded in all four cases at the same time) he had slightly more sensory disturbances and completely absent abdominal reflexes. However, there was less paresis on the lower extremities (raises right 45°, left 60°) and less ataxia. Otherwise his condition was like at the beginning of treatment. This means that all the new symptoms which appeared from time to time (of course, beyond the limits of "fluctuations") could be controlled.

Case 3. Vito V., 21-year-old male, had been sick at the time of his beginning P.C.P. treatment for over 3½ years. He had never had a remission but was constantly progressive, i.e., adding new symptoms to his old ones. He received 25 series of P.C.P. in 8 years, mostly consisting of 5 (exceptionally of 1 to 4) intravenous injections. He had always outspoken and mostly stereotyped *reactions* consisting of: marked feeling of heat with marked perspiration and flushed face and shiny eyes without rise in temperature. This reaction started sometimes 10 minutes and sometimes as much as 48 hours after the injection and lasted usually 1 to 2 days. Other reactions were: retention of urine; rarely urinary frequency; occasionally increased spasticity or paraesthesias in a leg or back; tremor of the lips; dizziness; severe backache. He was always very tired after the injection and usually spent two days in bed.

His status at the beginning of treatment was as follows: bedridden; had to be fed because of marked intention tremor; no ejaculations; retention of urine alternating with incontinence. He could stand and make a few steps when supported strongly by two men, with violent tremor of head and body. There were slight euphoric dementia, left temporal pallor with visual disturbances, and sluggish pupillary reaction to light. There were marked coarse nystagmus on lateral and upward gaze; scanning speech and pressed voice; weakness of the left palate and absent palatal and pharyngeal reflexes. Neck muscles were weak. Head and body showed marked intention tremor. Abdominal reflexes were partly absent. Upper extremities showed hypotonia; hyperactive reflexes; positive Hofmann; marked hypodiadochokinesis and intention tremor. The lower extremities showed: slight spasticity; moderate paresis (could raise 60° bilaterally); marked ataxia; intention tremor; adiadochokinesis. Pyramidal signs were positive. There was slightly diminished vibration sense in the toes.

This patient, too, as figure 2 shows, had during his 9 years of treatment 6 new attacks which responded to prompt treatment. Among new symptoms which could be controlled we mention: absence of vibration sense in entire lower extremities; diplopia; marked paresis of a leg; cessation of erections, etc.

In this previously chronic-progressive case there was, despite all new attacks since the onset of the treatment, a considerable trend toward improvement (see fig. 1). The last examination showed changes which have mostly taken place in the first half of the treatment period: no disturbances in vision, pupils, or speech; voice, palate normal. Upper extremities show nothing abnormal except minimal ataxia, minimal intension tremor, and hypotonia. Head and body tremor present only occasionally and briefly when patient steadies himself. The lower extremities show normal strength (raises 90°); definite ataxia; hypotonia; sluggish tendon reflexes; pyramidal signs. The only sensory disturbance is slight impairment of position sense in the toes. He can walk long distances in the hospital with one cane and holding on to the railing; he writes; he learned to weave skilfully; he speaks frequently over the hospital radio without any difficulty.

In his diary the handwriting reflects many of the clinical changes.

Case 4. George W. was 24 years old at the start of the P.C.P. treatment. He was then in the seventh year of his illness and in the third month of his eighth attack. He presented thus a very active case with marked tendency to remissions and relapses. He was treated with 12 series of Pancorphen in the following 8 years and followed up periodically (without P.C.P.) for the next 7 years. All series consisted of 5 intravenous injections except the last one, which was interrupted by the patient after 2 injections. He reacted then—which is not unusual—with severe backache and retention of urine, and instead of following our instructions he entered an orthopedic depart-

ment of a hospital. We thank Dr. Von Storch, in charge of the Neurological Division of the Montefiore Hospital, for an abstract of the record covering the years 1949–1951 (not adaptable to our Alexander scale).

The *reactions* of this patient to the treatment consisted mostly of fatigue; increased paraesthesias; often weakness of the legs; occasional double vision, urinary urgency or slight headache. With the years during a less active stage these reactions were slight or absent.

The condition of the patient 2 weeks prior to the start of the P.C.P. treatment was as follows: slight euphoric dementia; marked constipation; blurred vision on the left eye; slight nystagmus on lateral gaze; sometimes retention or urgency of urination; impotence; paresis of a rectus internus with diplopia. Right arm presented slight spasticity and paresis (pressed 22 kg. as against 55 on the left), hypodiadochokinesis and areflexia. The right leg presented: spastic paresis (raises 45° as against 90° on the left); positive Babinski and Oppenheim; clonic Achilles reflexes; abdominals were partly absent and the right cremasteric completely absent. There was diminished sensation for touch and pain from the fourth cervical segment down with hyperpathia for cold in the affected areas. The whole condition was in constant flux and showed some tendency to improvement prior to the beginning of treatment. Patient was able to walk 2 to 3 blocks unaided.

The further *course* of disease has to be appraised by figures 1 and 2. Among transitory spontaneous new symptoms at various times we mention: ptosis; eye muscle paresis; right lower facial weakness; weakness of the palate with absent reflexes; bilateral Babinski; absent vibration sense; electroparesthesia; ataxia; pareses; loss of taste and sensation on one side of the tongue; numbness of the penis, etc. There was a slight temporal pallor of both discs, later of the left only.

Two years after his last (interrupted) treatment patient had a relapse and entered the Montefiore Hospital. We quote one passage from the abstract pertaining to treatment:

"While in the hospital, patient received a multitude of therapies. These consisted of typhoid fever shots, without any improvement of symptoms. On Vitamin B_{12} and placebo therapy there appeared to be some subjective and a minimal amount of objective improvement, consisting of increased ability to use his lower extremities and to a lesser extent the upper extremities. Following a course of Vitamin B_{12} patient was placed on Vitamin B_{12} placebo therapy, on which he seemed to do as well. Patient was given physiotherapy and his gait improved somewhat so that at the time of discharge he was able to walk unaided. Patient was interested in occupational therapy from which he benefitted to some extent. Psychiatric consultant on one occasion thought that there was a definite psychoneurosis present."

After 15 years of observation we could agree with the latter opinion only if one considers the slight degree of non-progressive euphoric dementia with its characteristic infantilism, optimism, and suggestibility to be a psychoneurosis.

We examined the patient shortly after his discharge from the hospital. His condition—as far as the Alexander scale reflects it—was the worst he had ever had (292 points). However, a subsequent examination one year later showed an improvement by 20 points. Shortly after he had a new relapse but 1½ years later (the sixteenth year of our observation) was as good as before his last relapse (209 points). He was then under ACTH treatment. These last data were omitted from figure 1 for reasons of space. We see therefore that this patient after 20 years of illness was still capable of remissions not only under Pancorphen but also with other therapies or spontaneously.

At his last examination he felt stronger subjectively and could walk completely unaided a distance of one mile. He still had some paraesthesias in the lower extremities. He had infrequent erections, no emissions, and no libido. His urination was normal and the constipation greatly improved. His mentality was unchanged. There was a slight left temporal pallor. The speech was normal; there was a trace of unsustained nystagmus and a questionable lower facial weakness. The upper extremities were very strong (pressed 45 kg. with the right, 40 with the left hand); otherwise they were normal except for slight right bradyteleokinesis.

The gait was only slightly atactic, Romberg slightly positive; the left knee and ankle jerk were hyperactive, and there was left ankle clonus. Babinski and Chaddock were ++ bilaterally; Oppenheim + on the left side.

The muscle tonus was diminished. Abdominal and cremasteric reflexes were absent. Sensibility was completely normal.

All four patients had cold extremities and suffered from chronic constipation. These phenomena responded on most occasions to single injections as well as to an entire series of P.C.P.

In addition to this group of partly younger cases we could treat at Goldwater only very advanced, bed or chair-ridden cases. Of those cases 3 received more than 3 series of Pancorphen.

One case was only in the third year of her disease but represented an extremely active chronic-progressive process. She was bedridden at the beginning of treatment. She received 4 series which failed to stop the rapid progression of her illness. She died from bulbar symptoms after only 4 years of illness and 1 year after the last treatment.

The other case was a case with remissions in the history who was extremely advanced. He was treated in the fifteenth year of illness, had 7 series, and showed after some of them slight objective remissions. He too died in the twenty-first year of illness, 2½ months after the last injection, from complications (decubitus, pyelitis, pneumonia). Autopsy showed innumerable plaques, many in the medulla, and reaching into the cortex; there was slight atrophy of frontal lobes and dilatation of ventricles.

The third case was observed only 1 year and had 4 series. This chronic-progressive case of almost 8 years' duration responded twice with slight, twice with moderate improvement involving speech, intention tremor, eye muscles, vision, bladder, and potency.

It may be of interest that the first two cases were the only cases which showed allergic skin and mucosa reactions. They were desensitized with Pancorphen dilutions, and one of them lost all "clinical reactions" after that, the other still responded occasionally. In one case menstruation recurred temporarily during the treatment after 2 years' cessation.

We are able to supplement these 7 cases by unpublished data of *6 cases* of long-range treatment from our first published series. Five of these cases were highly advanced—bedridden for years. The average duration of the disease at the beginning of treatment was twice as long as that of the total sample: 17 years instead of 8. These patients received 4 to 8 series each.

The best of these cases was treated during 4 years and followed up for 9 more years. Started during a beginning remission, it showed a progressive type of remission for the next 22 months and a stable condition in the next 43 months. Four months after the last series there was a relapse. Treatment was not available, and the disease progressed relentlessly in the following 9 years.

Another case, treated between the nineteenth and twenty-eighth year of his illness, showed slight remissions after most of the 9 series.

Two cases started during progressive attacks of 2 years' duration and showed improvements in the first treatments but not later.

One case, started in the sixth year of a progressive attack, showed sometimes very brief and therefore inconsequential remissions.

One case was treated between the twenty-ninth and thirty-third year of illness. Started during a remission period, it yielded quite satisfactory results.

We could add here another control series: 15 cases of *short-range* treatment from the same period and the same hospital (Goldwater) for comparison. These cases were on the average older than those chosen for long range therapy. A chronic hospital like Goldwater offers as a rule the most unfavorable cases.

In order to save space we shall lump all our 22 Goldwater cases together and try to consider their prognosis at the time of the first treatment based on our original group of 140 cases and our article on prognosis (4).

Our present series had a higher percentage of chronic-progressive, i.e., non-remitting cases (32 per cent against 19 per cent on the original series). Nine cases were classified as very advanced. 11 as advanced, 2 as moderately advanced. Nine were bedridden, 9 chair-ridden, 2 could walk with strong bilateral support, one with unilateral support, and one without support.

According to our own standard figures (4) we could expect:

1. An average of no more than one spontaneous remission in 4.4 years or 0.23 remissions per sickness-year; our 4 long-range cases show already before the P.C.P. treatment

a somewhat more favorable picture (1 in 3.4 years). During the P.C.P. treatment remissions occurred more than 3 times as often (one in 12.1 months). However, more remissions means also more relapses.

2. In 30 to 40 per cent of cases we may expect freedom from relapse within 3 years of an attack. Before the treatment only 1 of our 4 patients had one period of freedom longer than 30 months; the same was the case in another patient in the post-treatment period. In no case did we have such a long period during the treatment.

3. The average bout-free interval in our first 140 cases before Pancorphen was 28.6 months. This was much shorter in our 4 cases: 9.7 months. During the treatment it was even slightly shorter than that: 8.8 months (excluding the last remissions in 3 cases which were observed for an average of over a year without relapse). This illustrates the "disorganization" of the disease during the treatment: more remissions, more relapses.

4. In general, there is in M.S. no regularity in the relation of the average duration of the attacks and remissions. However, the average duration of the remissions surpasses that of the attacks by 2 to 5 times. This was not so in our first 4 cases: the ratio $\frac{\text{duration of remission}}{\text{duration of attack}}$ was in 1 case 3; in the 3 other cases it was much worse: 0.9, 0.5, and 0 (no remission). During the treatment period this ratio improved in all 4 cases. It became 6, 2, 2, 5.2, respectively. Or, in other words, the time spent in remissions was before the treatment 0, 42, 72, 29 per cent, respectively, of the total sickness time; after the treatment started the respective figures were 81, 70, 84, and 62 per cent.

5. We called the attention of our readers (4, 5) to the "progressive remissions" i.e., improvements progressing further spontaneously for more than 2 months. We found them occurring under Pancorphen therapy three times as often as without it, although the figure for "spontaneous progressive remissions", i.e., without treatment, is perhaps not yet firmly established. In our 4 cases there is definitely no instance of "spontaneous progressive remission" recorded before the Pancorphen treatment and 11 such instances during the treatment period, lasting from 3 to 19 months, an average of 7.5 months. This average duration of progressive remission is shorter than in our original group of 140 cases where it was 10.7 months.

6. The average duration of illness at the time of the first treatment was longer in the present group (9.5 years) than in the original group (8 years). It was slightly shorter (7.5 years) in the 4 long-treated cases. The duration of the last attack of illness, i.e., at the start of P.C.P. treatment, in those 4 cases varied between 2 months and 8 years, the average being about the same as in the original group (32.1 months as against 34.5). What matters particularly is the established fact that the chances of a spontaneous remission are particularly bad in attacks progressive for more than a year (4). One of our cases belonged definitely, and two probably, in this category: at the time of the first treatment one had been progressive for 2½ years; the second had been progressive for 5 years, became stationary for a few months to become progressive again in the 4 weeks preceding the first treatment; the third case had been progressive for over 3 years with a 2-week interruption (slight remission) 6 weeks prior to the treatment.

To sum up: our present sample has from the beginning much more unfavorable prognostic features than our first sample of 140 cases and that includes our 4 main cases.

Correspondingly we must expect that the therapeutic results with any treatment will be statistically worse than in the original group of 140 cases from an "acute" hospital. What are the facts?

After one series of Pancorphen in the original 140 cases we observed 25 per cent considerable, 36 per cent moderate, and 23 per cent slight remissions. In the present series of 17 cases the results with one series are somewhat worse: 17.6, 17.6, and 35 per cent, respectively.

In our first series 61 cases on one repetition of the course of 5 injections achieved in 5 per cent a better degree of improvement than the first time; in 30 per cent equal and in 31 per cent poorer improvement than the first time was obtained. In the present series of 13 cases on the first *repetition* of the series the quality of improvements is also worsening: considerable 0, moderate 23 per cent, and slight 38 per cent.

On more than two series 53 cases out of our

first series had better improvements than before in 15 per cent, equal in 9 per cent, and poorer in 21 per cent. In 9 cases of the present series who received 3 series of injections the improvements after the third series were: considerable in 11 per cent, moderate in none, and slight in 44 per cent.

Since by our methods only *changes* in the patient's condition are evaluated, we can rarely expect, e.g., that a patient who has achieved a very marked improvement on the first series will achieve again on repetition a "very marked" degree of improvement. The positive aspect—that further improvements are achieved on repetition—is more important.

Conclusions

This article deals with the question whether a series of 5 Pancorphen injections which yielded a high percentage of partial remissions of non-permanent nature in a large number of cases should be repeated and how often. Can we expect on repetition: 1) a cure of the disease? 2) prevention of new attacks? 3) lengthening of intervals between the attacks? 4) shortening or cure of new attacks?

We base our conclusions on 7 cases of multiple (more than 3) treatments from Goldwater Memorial Hospital. To these cases we could add 6 more cases from our previously published series. All these cases were treated and followed for years.

Our tentative conclusions from these thirteen cases are: 1) even old and advanced cases can still yield partial remissions of various degrees; 2) this result can often be repeated; 3) there is no doubt in most instances about the sequence and the probable causal nexus between treatment and remission; 4) repeated treatments given in time can favorably influence the course of the disease; 5) the treatment in the form hitherto described produces no cure; 6) a repetition of the treatment from 4 to 26 times in its present form does not arrest the disease or protect from relapses in the future; 7) very advanced cases give less favorable results than less advanced; 8) treatments started in the beginning of an attack give much better results than those started late in the attack; 9) treatments given 2 to 3 times per year are probably better than those given at longer intervals; 10) treatments given in a remission period probably further the progress of remission; 11) progressive type of remission is more frequent with Pancorphen treatment than without it; 12) the interval between bouts of disease is not shortened, but the total time spent in attacks is shortened; 13) the duration of an attack is shortened to a point that we can speak of "aborted attacks."

Should the treatment be continued indefinitely 3 times a year in series of five injections? More experience with much longer periods of treatment will be necessary to answer this question conclusively.

We are convinced that the treatment should be given: 1) in every beginning attack; 2) in progressive (active) attacks no matter of what duration; 3) during inactive as well as progressive remissions. It is true that treatment in active stages requires more caution and still more individualization than in the inactive stages; it is also true that any aggravation of the disease in a progressive attack is likely to be interpreted not as absence of therapeutic effect but as iatrogenic aggravation. Nevertheless it is logical to assume and corroborated by experience that the active periods of disease, progressive or new attacks as well as progressive remissions, hold more promise for any therapy than the inactive periods of stabilized defenses which also yield therapeutic results.

For the time being we recommend therefore: continuous treatment with series of five intravenous injections, strictly individualized (5) three to four times per year plus extra emergency treatment in case of appearance of new symptoms.

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PSYCHODYNAMIC MANAGEMENT OF HOSPITALIZED PSYCHOTICS

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This paper describes case material demonstrating the applicability of psychodynamic understanding to the management of psychotic behavior in a hospital setting. Such behavior is well known, and is a problem in any mental institution. Lectures on psychodynamic psychiatry dependent, as are most psychodynamics of this day, upon the discoveries of psychoanalysis, were presented to a group of nine graduate psychiatric nurses. Detailed observations by these nurses, the physicians, and ward attendants are presented in a weekly conference and form the basis of an initial psychodynamic formulation. A therapeutic management plan is evolved, the execution of which provides further observation. A more accurate and detailed psychodynamic formulation becomes possible as knowledge of the patient increases. The therapeutic management plan is altered accordingly.

CASE NO. 1

This was a 35-year-old man who, prior to coming to Northville State Hospital, had been hospitalized elsewhere for a period of about 8 months and was finally committed because he showed no response to therapy. His chief complaint was that he had a terrible headache and, on the behavior side of the picture, he had attempted suicide by crashing head first into a wall on a number of occasions. On the ward he was extremely disturbed most of the time. He complained of a severe headache and would often bang his head against the wall explaining that he was attempting to relieve this headache. He was given 20 electroshock treatments with no discernible improvement. Vast quantities of sedatives were given without avail. One night one of the physicians went over to see him during a time when he was upset and found him to be relevant and coherent with no psychotic content in his productions. He told the doctor how much better his wife was than he, he told of how he had been mistreated by an aunt who had adopted him in childhood. That night, following a visit from his wife, he had become upset and had smashed a cabinet with his fist and had banged his head on the wall. This case was presented in the therapeutic problem conference and the following management plan was embarked upon: 1) his wife would be denied visiting privileges, 2) he would be taken off all medication, 3) he would be told to carry out an assignment scrubbing the floors on the ward as part of his therapy.

The reasoning behind these measures was as follows: 1) his wife was denied visiting privileges because her visits seemed to aggravate his disturbed behavior, 2) all medication was discontinued because it failed to affect him therapeutically and provide him with relief, 3) he was given a job of scrubbing the floor in the belief that this would provide for a discharge of psychic tension through muscular activity.

The patient performed his assignment somewhat unwillingly but, at the insistence of the physician, carried it out satisfactorily. He worked scrubbing the floor for 3 days, and then volunteered to go outside and cut the grass with a lawnmower. He was encouraged to do this and spent a week and a half on this detail. At the end of this time the patient's headaches had disappeared. His behavior of banging his head against the wall ceased, and his explosive outbursts of hostility vanished. He told the doctor, who asked him about the disappearance of his symptoms, "Something has happened to me inside. I can't tell you what it is, but I'm better." The patient was discharged two weeks following this incident with no evidence of psychosis present. We would have much preferred for him to stay in the hospital for another 30 days or so, but he was reluctant to do this, and we felt that no benefit would accrue if he were forced to remain. Three months after his discharge, the patient was working full time, had no somatic complaints, and had expressed an interest in coming to our out-patient department for psychotherapy.

CASE NO. 2

This is a young schizophrenic woman who was mute, uncooperative with ward routines,

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and had been refusing to eat for some time. It was suggested in conference that the nurse take the patient aside, hold her head crooked in her arm, and tell the patient firmly that she was going to feed her whether she liked it or not, that she needed to eat and that she, the nurse, wanted the patient to eat to live. It should be remarked that prior to this particular nurse-patient contact, the patient had been forcibly held down on a number of occasions for tube feeding. This procedure had not affected her refusal to eat. When the nurse carried out the suggested procedure, the following observations were made: The patient violently shook her head as the food was presented to her lips and then would make a lunge for the food and gulp it down. She repeatedly showed this behavior in regard to the food which the nurse forced her to take. The same procedure was carried out several times by the nurse. For some time now the patient has been eating by herself. She goes to the table, shakes her head negatively and then will gulp the food, then she will shake her head "no" again, and then gulp more food. It was felt that the nurse's unspoken acceptance and her non-critical attitude toward the patient and her sincere desire to have the patient eat her food were largely responsible for a solution to this particular management problem.

CASE NO. 3

The patient is a young schizophrenic woman who, since her hospitalization here, had refused to take off her clothing and go to bed at night. On a number of occasions, she had been forcibly undressed and put to bed, but this had required the constant attendance of ward personnel to keep her there. The minute they left her, she would get up, put on her clothes if she could find them, and if not, sit down on the floor and sleep in this fashion. The patient could tell the nurse very little about herself and nothing of her feelings when going to bed. A tentative management plan was suggested in conference as follows. The nurse went to the patient and told her firmly yet kindly that she cared for her and was going to help her and that nothing the patient could do was going to stop her efforts. She said to the patient, "Come, let's go to bed. It's time for you to go to sleep." The patient refused, and the nurse, who was rather hefty, picked up this frail girl and carried her to bed and placed her therein. The nurse left without comment. The patient immediately got out of bed and went to the hall and resumed her sitting posture there. The nurse again picked her up and placed her in bed telling her, "I want you to get undressed and go to sleep." She tucked the patient into bed and reported that she had experienced a maternal feeling during that time. The first time she had carried the patient to bed, the latter's arms hung limply down by her side and she seemed to be behaving like a child. The second time the nurse went to her and picked her up, the patient put her arms around the nurse and clung to her very much as a young child might do. This altered in a really remarkable way the previous behavior of the patient. For some time now she has been going to bed willingly, undressing herself, and no longer presents the ward problem she did previously. Initially, there was a return to her old behavior, but reappliance of the same technique by the nurse previously mentioned was again effective.

CASE NO. 4

The patient is an 18-year-old schizophrenic girl who was hospitalized for the first time a few months ago. She was presented in conference because she consistently vomited after each meal. Because of this, considerable attention had been devoted to her, but her symptoms continued nonetheless. A nurse had observed that she did not vomit when she ate food brought to her from the Snack Bar. Her psychiatrist had reported that the patient had refused to talk with him, giving him the explanation that she was "afraid of men." The details of her eating were closely examined and several facts became known. One, once another patient had waved a silver knife in front of her face and she had vomited promptly. Two, the food in the cafeteria was eaten with silverware, whereas that from the Snack Bar (sandwiches, milk shakes, soft drinks, coffee, etc.) was not. The patient had had several episodes where she had destroyed things in her room—always, however, preserving certain possessions which were dear to her. The patient was placed on a diet which could be eaten without silverware. All vomiting ceased immediately this was done. The nurse encouraged the patient to talk with

her and learned by this of many fears and anxieties which she had never been able to tell to anyone before. It was decided to remove the patient from the special diet which had been prepared for her. The vomiting has not recurred in relation to eating, but was observed on one subsequent occasion after the patient's mother visited her. The nurse told us that she was concerned about getting "too close" to the patient. When asked how she did feel about the patient, she said that she felt toward her as she would toward a younger sister who was sick and needed help.

CASE NO. 5

The patient is an 18-year-old schizophrenic boy who became overtly psychotic five months ago. During his first week of hospitalization he seemed to get along well with ward personnel and other patients. He volunteered to help with ward work and joined in activities. He read quotations from the Bible and explained each one of them to anyone who would listen. He complained of his feet bothering him, pains in his abdomen, and numerous other physical complaints. Also during this period he refused to see his parents. The patient used profane language and stated if he ever got to a lawyer he would have his parents prosecuted. He remarked how his mother and family told him he was "off his rocker." He said he had lived with them all his life and never did anything to them and now they didn't trust him. The patient seemed to have a superior and "know-it-all" attitude. During the next few weeks the patient would sing loudly, annoying other patients, criticize other patients for playing cards and ball, and make sarcastic remarks to patients and employees alike. There were nurses on the ward, and one of them began to work with him. One day he would be very flattering, congenial, and cooperative; the next he would be sarcastic, negativistic, and say, "Get away from me, you stupid ignorant female." He continued to complain of many physical ills, refusing dinners for several days, and saying, "It won't stay down if I do eat." At times he would hit the wall with his fist as he walked down the hall. Most of the time the other patients took the attitude, "poor kid," and accepted his "know-it-all" behavior. Often the patient would shout down the hall embarrassing remarks to the nurses such as, "Hey! Bow-legged. Where are you going, you homely female?" He was also stepping on the nurses' shoes, getting them dirty, and twisting their arms, etc. When the nurses showed little or no emotion, he would become angry, saying, "Haven't you nurses any guts, haven't you any backbone? Why don't you get mad?" The patient was discussed in therapeutic problem conference. It was decided that he should be assigned to scrubbing one of the bathrooms daily under the supervision of an attendant. When told about his work assignment he said, "O.K." with little affect. He did this detail for two days and then refused. In conference it was suggested that the patient's physician tell him that work was therapy for him and that he must do it if he wished to get better. The doctor reported that the patient had been most agreeable when he took the matter up with him. The nurse reported that no sooner had the doctor left the ward than the patient said to her, "You can tell that damned doctor he can take his damned job and cram it. I'm not about to do it." She had asked him why he didn't tell this to the doctor and he replied, "He didn't ask me!" After this he did his job daily, even asking to do it when attendants were slow taking him out. While playing softball, he fractured the little finger of his right hand. A splint was ordered for it, but the patient took it off almost every day and came to the nurse for a new splint. The doctor told the patient he wanted the fracture to heal properly and that if he persisted in removing the splint, he would place a cast on his hand. After this the patient let the splint stay on until the nurse suggested changing it because it was dirty. The patient continued stepping on the nurses' shoes, behavior which both annoyed and angered them. It was suggested in conference that the doctor tell the patient he could talk all he wanted, but could have no physical contact with the nurses. The patient apologized to the nurses that same day and did not repeat his behavior. Somewhat later the doctor told the patient he must stop embarrassing the nurses by shouting insulting remarks. The patient again apologized and discontinued this activity as well. He began showing marked improvement as the management plan progressed. He has continued his work de-

tail and is very cooperative and friendly on the ward. He no longer tries to be the center of attention. He can accept suggestions and helpful criticisms. After being hospitalized for three months, he went home on his first leave of absence. His behavior was consistent when he returned. Each weekend thereafter he has been home and has been prompt in returning to the hospital. He has continued his work detail and is asking if he might be assigned to outside work.

We have presented here a few case examples demonstrating how psychodynamic understanding has been applied to the management of the disturbed psychotic behavior. Perhaps the most outstanding result of this intrahospital program has been the enthusiasm with which our medical, nursing, and attendant staff have continued to work closely with psychotic patients.

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A CASE STUDY OF A MALE TRANSVESTITE WITH EPILEPSY AND JUVENILE DIABETES*

BEBEL K. PETRITZER, M.D.†, AND JOHN FOSTER, M.A.‡

Trans means opposite; *vestism* means dress. It is the desire to appear in the clothes of the sex to which the person in question does not belong. Transvestism is synonymous with eonism. which is derived from the name of a French diplomat, Chevalier D'Eon.

Chevalier D'Eon de Beaumont was born in 1728. At the age of 25, he was slender and of a girlish figure. He was sent by the French Government on a diplomatic mission to Russia. He accomplished his mission by disguising himself as a woman. He became the Emperor's Lady-in-Waiting. Returning to France after a successful mission, D'Eon was accused of assault. He again donned feminine attire and thus escaped arrest. He never married and lived to the age of 83. He died in London after spending 49 years of his life as a man and 34 years as a woman. He preferred female company. He possessed all the attributes of a woman.

Transvestism has to be differentiated from fetishism. The latter may be defined as a perverted admiration of some inanimate object, strongly associated with sexual desire and gratification. Garments of almost every description have served as fetishes. There are garment fetishes, hair fetishes, odor fetishes, etc. The garment fetisher derives his fetishism from early experiences which leave the imprint of a sexual picture on his unconscious mind. Later in life, the memory being revived, it provides a form of sexual outlet and, in a time of confusion, fetishism materializes. Sometimes, the transvestite carries on these masquerades in secret, masturbating and fantasying the role of the opposite sex.

Havelock Ellis describes transvestism under the name of eonism, and believes that the persons, although dressed in clothing of the opposite sex, were not sexually inverted. The genuine eonist has a repulsion for the homosexual man; the attraction toward the female sex is not of an erotic nature.

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Magnus Hirschfeld and his school maintain that transvestism is not an acquired tendency, that it is innate and becomes stronger as the subject advances in age. Hirschfeld distinguishes ten categories of transvestites: 1) the complete transvestite wants to change his sex; 2) partial transvestite has a desire for silk stockings and underwear; 3) transvestite in name, adopts a Christian name belonging to the opposite sex; 4) constant transvestite; 5) periodical; 6) narcissistic transvestite; 7) metatropic, seeking the love of mannish woman; 8) bisexual; 9) homosexual and 10) automonosexual—autists, sexually attracted by their own bodies.

Moll classified various types of transvestism as follows: 1) Impulsive state to wear clothes of opposite sex. 2) Homosexual cases, in which cross-dress constitutes part of the contrary state. 3) Heterosexual cases: sex impulse normal, in which cross-dressing constitutes part of a contrary sexual state. 4) Cases as due to pronounced heterosexual desire to imitate and enter into feelings of the opposite sex. 5) Cases in which concealment of occupation is sought: pseudo-transvestism.

Abraham considered it as a hysterical manifestation.

Stekel has proved that these cases belonged to latent homosexuality.

According to another school, namely London and Caprio, transvestism is a form of compulsion neurosis with an exhibitionistic element, in which the patient's desire for the genitals of the opposite sex is displaced to the clothing of the opposite sex. A similar view is expressed by Stekel and Guthiel, referrring to cross-dressing as a symbolization by the male or female of being identified with the opposite sex.

Fenichel regards transvestism as a masochistic perversion and quotes the figure of Hercules clothed in woman's garments and serving his mistress Omphale.

No psychologist or psychiatrist has succeeded in giving a satisfactory explanation of the cause of the affection. It is possible that

physical and bio-physio-chemical factors may play a role. Determination of urinary excretion may show predominance of hormones of the opposite sex, gonadal and adrenocortical. Chromosomal change is another theory to explain the nature of transvestism.

The intersexual manifestations, according to the view of most of the biologists, may be explained by the hypothesis that the chromosomes, which number forty-eight (48) differ in the two sexes. In both there are 23 pairs, but it is in the remaining pair that the main sex determining function lies. It is in the latter pair that the ovum and the spermatozoon differ. In the ovum, this sex pair of chromosomes is made up of 2 x units; thus, the xx combination is the characteristic one for the female. In the spermatozoon, this pair of chromosomes consists of an x and a y unit.

According to Goldschmidt and Von Neugebauer, sex is not primarily determined by the gonads, but by a bio-physio-chemical struggle between male and female chromosomes. The type of sexuality will be determined by the preponderance of the x or y units in the chromosomes. It is reasonable to assume that bio-physio-chemical factors based on chromosomal imbalance play a role in creating the transvestite picture of maleness or femaleness.

In most cases, transvestism can be traced to early childhood and is being exhibited in the play pattern, in his or her isolation from the playmates. The feeling of being a person of the opposite sex will be the dominant factor in the patient's life. These individuals may develop hostile feelings against society, being in the grips of continual mental stress, which may bring about inner conflicts and lead to anxiety neurosis. When the male eonist wears female clothes, he experiences mental relaxation and a sense of well being.

Case Report

E. A., 14 years old, was admitted to the Institute on February 21, 1950, as a ward of the State Board of Child Welfare.

Family History. Father, 44: Chronic alcoholic. Grandmother and Aunt (paternal line) diabetics. Mother died at 35 from Addison's disease. Siblings: Male, 16 years old, is a mental deficient. Female died at 8 years from diabetic coma.

Personal History. E. A. born May 18, 1939, at full term. Childhood diseases: mumps, measles. He has had diabetes since the age of 2½ years. He was placed in foster homes at two different periods at the age of 10 years. He became a behavior problem, characterized by temper tantrums, was refractory to correction and disobedient, and became a serious behavior problem at home as well as in school. Nocturnal enuresis and sleep-walking episodes assuming the character of somnambulism have been observed in the foster homes. He was a patient at Mercer Hospital in 1949 and at the Diagnostic Center at Menlo Park in January 1950. He was discharged from the Center with the diagnosis of juvenile diabetes.

Since admission to the Institute, this patient has been on a diabetic diet. The blood sugar has been fluctuating between 36 to 299 mg. per cent. Sugar in the urine has been from plus 1 to plus 4. He has been on regular insulin 25 units in the morning; regular insulin 12 units and protamin zinc insulin 7 units in the evening. Complete blood count: within normal limits. Blood Wassermann and serology of spinal fluid were negative.

His seizures were of mixed type, ranging from 0 to 7 per month.

The electroencephalographic findings during the resting phase revealed paroxysmal cerebral dysrhythmia, signalized by bursts of high-voltage potentials, sharp formation with tendency to spike activity, a mixed rhythm of 15 cycles per second superimposed upon 4 to 6 cycles per second, spreading synchronously in all leads.

The electroencephalographic record of May 6, 1950, revealed cerebral dysrhythmia signalized by sequences of hypersynchronous discharges, both beta and delta rhythm, and also bursts of wave and spike component, spreading bilaterally in paroxysms in the parietal, temporal and occipital territories, with predominance of activity in the cortex of the right hemisphere.

The electroencephalographic recording of November 9, 1953, revealed paroxysmal dysrhythmia signalized by several bursts of medium and high-voltage potentials, wave and spike component, spreading in homologous areas of the cortex. A great part of the record displayed runs of medium voltage, alpha activ-

ity in all leads, which is consistent with the pattern of this age group level.

The neurological examination was essentially negative.

X-ray of skull: Oval in shape; vault thin. Sella turcica measured 6 x 5 mm. Clinoid processes approximated. Frontal sinuses not developed.

School Record: The records show that E. A. was admitted on February 21, 1950, and was enrolled in D. School on September 5, 1950. He has matured greatly in the past two years and has shown considerable improvement in his academic work. He is working on 4th and 5th grade levels. He needs understanding and affection; must be strongly motivated by the teacher most of the time. E. A. is one of the leaders in his group. He is cooperative, courteous, helpful with other children. He has many original ideas and carries throuth to the best of his ability. Part of his slow development may be due to his diabetes and to the fact that he has been a State ward for some time.

The psychometric tests made on August 8, 1950, disclosed the following: Chronological age: 11 years, 2 months, 3 weeks. Mental age: 8.6. I.Q.: 76. Goodenough: Mental age 6.9. Rorschach tests suggested low average intelligence with lack of emotional development and plasticity. The Machover figure-drawing test suggested immaturity, oral dependency and passivity, disinterest in boys of his age.

Special Psychological Examination (December 14, 1953). Tests administered: Wechsler-Bellevue Intelligence Scale Form I, Verbal I.Q. 67, Performance I.Q. 92, Full Scale I.Q. 77. Rorschach, House-Tree-Person Drawings.

E., at age 14½ years, is a smooth-cheeked, chubby, effeminate-looking boy. He presents a good appearance and creates a favorable attitude in others because of his apparent "normality," both intellectually and physically. He answers questions relevantly, coherently and with seeming frankness. However, he shows little spontaneity, volunteers no information and does not elaborate his replies. Although he knows how to ingratiate himself with those persons in his environment who represent authority, he is cagey and shrewd and does not really develop any warm interpersonal relationships. He is evasive and reluctant to discuss his personal affairs.

In the interview, he discussed his visits with a family in Princeton, who had taken an interest in him. On these occasions, he said he occupied himself by helping his "mother" with the housework. He was questioned whether he had made the acquaintance of any young people or had had any dates while on these visits and he replied in the negative. Furthermore, he appeared to have no interest in dating or other social activities common to youngsters of his age.

At the institution, he helps around the cottage by folding clothes, setting the table, and helping the younger children brush their teeth. He shows little interest in competitive sports, games or the usual activities of teen-age boys. He states he likes to typewrite and is learning to play the piano and saxophone. His stated ambition is to become an office worker, an employee in a store or a florist's helper. He has shown marked feminine interests including a liking for sewing. He has also openly participated in transvestite activity, dressing in female attire and using rouge and lipstick.

A review of his history brings several pertinent facts to light. Rejected by his father at an early age, he turned to his mother and spent much time with her during a long period of illness. Upon her death, he kept many of her belongings, which he treasured highly. He became a ward of the State in May 1949, and was admitted to this institution in February 1950. In the interim, he was hospitalized twice and placed in three different foster homes.

Psychological testing gives the following information about E.'s present status. Intellectually he is functioning between the levels of mental deficiency and dull normal. He is particularly weak in verbal ability. His fund of general knowledge is poor, his vocabulary is extremely weak and his ability to perceive and utilize abstract concepts is severely limited. He does much better in the non-verbal sphere. This could reflect a deficiency in his educational experience or may represent a more serious personality defect.

The Rorschach record reflects the poor verbal ability and the weakness in dealing with abstract concepts noted in the intelligence test. However, even more serious intellectual defects are indicated. He is inclined to draw sweeping conclusions from one or two rela-

tively insignificant factors in his environment and thus end up with a distorted evaluation of the circumstances. He also tends to combine unrelated elements and build up a concept which may have little or no relationship to the true situation.

The Rorschach also points out his introversive, narcissistic and immature personality. He has difficulty in establishing and maintaining contact with others. He is withdrawn and has little true social interaction. He tends to be hypercritical of others and much prefers spending his time in fantasy and daydreaming to establishing any interpersonal relationships. It is interesting to note that E. never really sees in the blots a whole human being, but rather sees human details such as arms and feet, even when the whole human is easily and usually seen. The Rorschach responses also indicate his hostility and negativistic attitudes.

The projective art drawings confirm what was found in the Rorschach and contribute further understanding to the personality dynamics of this boy. His sexual maladjustment is strikingly portrayed in his drawings of the human figures. He identifies with the female and demonstrates castration anxiety. There is evidence of oral erotism, preoccupation with infantile sexual impulses, furtive sexual fantasies and serious lapses of judgment with regard to his sexual behavior. Exhibitionism, voyeurism and homosexual conflict are all indicated.

Summary

In E., we have a 14½-year-old male, who functions at an intellectual level between that of mental deficiency and dull average. He is feminine in appearance and shows strong feminine interests while eschewing the usual masculine pursuits of his age group. His stated vocational ambitions are more feminine than masculine. The projective personality tests indicate he is a narcissistic, withdrawn, hypersensitive person, who has manifest sexual conflicts. He shows trends toward voyeurism, exhibitionism and homosexual behavior while identifying with the feminine role. Thus his previous record of overt transvestite behavior appears to be more than a transitory episode.

This boy is 4′4″; weighs 115 pounds; is well developed and presents a primary constitution of feminine type: rounded figure, large fat breasts, adiposity of the lower abdomen, and configuration of the buttocks. There is mannerism in his gait. He has a soft, somewhat high-pitched voice. His genitalia were markedly underdeveloped at the age of 11 (the testes not palpable in the scrotum). At present, the testes are in the scrotum, underdeveloped for the age of 14.

He has been observed in his everyday activities and behavior by the Psychiatric Technician on the ward, who submitted the following report:

"When the patient came to our ward he had in his possession numerous female articles of clothing: slips, brassieres, falsies, nylon panties and stockings, an attendant uniform, white shoes and stockings, also a house coat, dresses and dolls. I questioned him concerning these articles and he replied that they had been given to him by his aunt and other friends. He also said he liked to wear these clothes, that he felt more at ease in them than in male clothing. He would don female clothing and preen in front of the mirror. He would also steal female clothing out of the laundry. I noticed he did not seem to be attached to girls as a boy his age should be, neither did he have a preference for any of the boys. This patient was very self-centered and arrogant. He absolutely refused to soil his hands or do any work around the cottage. He sneered at the other children, and in general had a very superior attitude. However, he was always very neat and clean. He is always very modest about his body. At night, he sleeps with briefs on underneath his nightgown. He loves to do embroidery work and to sew. He states that he would like to be a tailor or a typist and do office work. He has been using lipstick.

"I spoke with him about wearing female apparel. I explained that he should try to get away from this sort of thing. We had several talks. One day, he came down stairs with all his female possessions and stood in front of me and tore all his clothes in small pieces, meanwhile crying as if his heart would break.

"After this episode he really tried to refrain from his previous habits. He does not wear female clothes, he takes pride in his own male clothing, he is scrupulously clean, washes his socks and shirt out every night. He is very cour-

teous and tries to mingle with the other patients. He still is more or less a lone wolf. He is among them but not one of them. His only friend is a girl, age 12 years. She will do anything for him, but he is merely tolerant of her. He does not reciprocate her affections. In fact, I have not noticed any overt affection toward anyone on his part.

"The few people he has expressed admiration for are a school teacher and two of the Grey Ladies. He says they remind him of his mother, or are like his mother. He loves to give parties and to decorate and play the host. He loves the limelight. He likes to hang curtains, fix closets, arrange things and dress the smaller children. He does not care for reading; he professes to like baseball, but I notice his reception to sports is lukewarm.

"E. says he always dressed in female clothing at home, he says his cousins did also. He said he became handy with housework when his mother became ill and he had to care for her, cooking, cleaning, etc. I asked him how old he was at the time. He stated he was five years old.

"E. apparently has improved. I have seen him in female clothing only once since he destroyed his clothing. He is helpful, congenial and really appears to try to break his old habits.

"Since he stopped dressing in female attire, I have noticed that he associates with the other children, boys and girls, less and less. He prefers to be by himself or hang around the employees; he loves to watch me set the girls' hair.

"At one time, he questioned me about the Christine Jorgenson case, which he read about in one of the magazines. He wanted to know if it was true, that a man could be changed into a woman and also how it was done.

"E. went on an errand one day, met an attendant he used to know and asked her for some high heeled shoes and dresses."

Comment

The personality development of this youngster can be understood in the light of his oral dependency, his early maternal overprotection and rejection by an alcoholic father and rejection by the foster parents. The mother's death occurred when the boy was at a very early age. All these were potent psychogenic factors at the basis of his personality structure, resulting in withdrawal, egocentricity, etc. His behavior patterns were operating on attention-getting mechanisms, which may explain partly the nocturnal enuresis and the episodes of somnambulism. E., at a very early age, adopted feminine tendencies and girlish manners. Nothing gave him more pleasure than to walk about in feminine attire, playing with jewelry, wearing rings, bracelets and a chain around his neck.

On the basis of the information we gathered from the foster parents and social workers, we may say that he could be classified in the group of the transvestite at a very early age. The psychodynamics of his transvestism are to be sought in the early infancy; in the indoctrination and identification with his mother figure. A close attachment to the person of his mother has something to do with the evolution of the tendency. The self-adornment with the female apparel in the boy gives a narcissistic veneer to his personality structure.

From our observations of his behavior and interrelationship with males and females of his age group level, we may assume that he belongs in the group of transvestites asexual and the whole psychodynamic picture is that of a compulsive neurosis, in which the main element is the wish to exhibit himself as a woman. Hence the anxiety he had experienced when he was met with a deterrent on the part of the Psychiatric Technician.

This boy does not experience any erotic attraction toward the females of his group, nor does he exhibit either any homosexual tendencies in his relationship toward the males of the same age.

It is worth mentioning that bio-physiochemical factors, in addition to the environmental factors, probably played a role in creating the transvestite picture of this boy.

The episodes of somnambulism followed by a stuporous state the following morning, and the nocturnal enuresis, may be regarded as manifestations of the autonomic nervous system, reactivated by an over-strained organism as a result of the pernicious influence of the environmental factors. It may be regarded as a reaction pattern to stress representing sym-

bolically a flight from a threatening environment.

We wish to emphasize the concept postulated by certain authors as to the mechanism of the episodes of somnambulism, as being intimately related to certain structures of the diencephalon—primarily the hypothalamus, the hypophysis and possibly the thalamus.

Dr. Joseph Wilder has found that sufferers from hypoglycemia are prone to somnambulistic episodes. In this case, somnambulism may be regarded as a component of a syndrome.

It seems probable that there is a distinct type of epilepsy associated with endocrine dysfunction and the autonomic nervous system. The physiological mechanism of the epilepsy in this case probably originated in the pacemaker of one of the diencephalic structures, the electrical discharges being fired from the latter to the cortex of the brain.

We know that the hypothalamus contains cells, secreting a hormone which stimulates both the anterior and posterior pituitary and controls the carbohydrate metabolism. The lability of the equilibrium between the autonomic nervous system and endocrine apparatus is an undeniable factor in precipitating paroxysmal discharges in a number of epileptics.

We are dealing with a case in which the epilepsy is superimposed upon diabetes mellitus and a syndrome of hypothalamic manifestations interrelated with the function of the hypophysis.

The ventromedial nucleus of the hypothalamus controls the diabetogenic hormone and consequently may be instrumental in producing diabetes mellitus. The diabetes mellitus in this case may be regarded as an end result of dysfunction of the pancreas, hypophysis and adrenals, as we know that the carbohydrate metabolism is controlled by a balanced mechanism of these glands. We should not fail to bring into the picture the role of the hereditary diathesis, both paternal and maternal.

According to many workers (Keller, Himwich, Barris, Ellaform and Ransom), hyperglycemia can be produced by stimulation of the lateral hypothalamus area, this increase of blood sugar is probably brought about by activating the sympatho-adrenal medullary system at the hypothalamic level. On the other hand, stimulation of the anterior hypothalamic area produces hypoglycemia. There is ample reason to believe that the hypoglycemia in such cases may be the trigger that sets off the epileptic discharge in an adolescent approaching puberty or a child who has a constitutional convulsive tendency.

A number of workers, such as Bantorim, Azerat and Pollock Boshes, in their experimental work were unable to produce convulsions in a number of cases in a marked hypoglycemic state with a level below 50 mg. of sugar. In other instances seizures occurred from 2 to 12 hours after the hypoglycemic state. These patients had been having seizures independent of injections of insulin.

It is reasonable to assume that the hypoglycemia per se is not sufficient to produce convulsions. The epileptic diathesis, based on a genetic predisposition, creates the physiochemical potentiality of the cerebral cortex to fire neuronal discharges bringing about convulsions. The endocrine dysfunction can exacerbate or precipitate pre-existing metabolic disorder of the central nervous system.

Our patient, E. A., has had seizures produced by a hypoglycemic state and at periodic intervals between the hypoglycemic episodes, without the characteristic prodromal symptoms heralding the latter episodes—viz. hunger, weakness, palpitation, tremor, diaphoresis, restlessness and confusion—and without relationship to the intake of food.

His body structure and his feminine manneristic demeanor would justify classifying him in the group of pituitary dysfunction, a factor which would enhance the hypothesis that the epilepsy of E. is related to an endocrine dysfunction. The somnambulistic episodes, the nocturnal enuresis and the temper tantrums in childhood constitute components of a syndrome related to an epileptic constitution.

According to Drs. Fijo Temmes and Erkki Toivakka, of the University of Helsinki, the etiology of enuresis should not always be attributed to a personality disorder or inner conflicts. In 70 per cent of their patients between 3 and 16 years of age the electro-encephalograms revealed paroxysmal dysrhythmias indicative of epileptic potentials.

SUMMARY

The material presented in this paper constitutes a study of an institutionalized prepubertal boy with a history of epilepsy complicated by diabetes mellitus and transvestism. The case has been presented, discussed and evaluated in its various clinical phases.

The seizures were controlled by anticonvulsant medication, i.e., Dilantin sodium grain 1 in the morning and phenobarbital grain 1 in the evening. He has had no seizures and no anticonvulsant medication since December 1952. The electroencephalographic recording taken on November 9, 1953 showed improvement in comparison with previous ones.

E. left the institution on December 16, 1953 and was placed in a foster home under the auspices of the State Board of Child Welfare. He was discharged as improved on June 9, 1954.

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BOX 1000

LANGUAGE AND PSYCHOTHERAPY

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Day by day the medical profession is becoming more interested in psychotherapy, not only in connection with psychiatry and psychotherapy, but in the field of internal medicine and the specialties as well. The emphasis on psychomatics and the importance given to psychological influences in health and disease have brought out the necessity for a better knowledge of this branch of therapy and its various applications.

Unfortunately, despite the ever-increasing number of publications on the matter, there is still lacking a study on the basic foundations of the different methods. The young doctor interested in psychotherapy finds himself in a difficult situation. On the one hand, his attention is strongly attracted by the different schools of thought, each proposes different procedures and binds him from the beginning to a series of theoretical implications which tend to blind him to other possibilities and force him to follow a path which, in spite of being important, may be limited.

On the other hand, if he does not wish to enroll from the beginning in one of the established psychotherapeutic schools, he finds himself lost among them, not knowing where and how to start.

We believe in the possibility of teaching the basic methods, leaving the psychotherapist free, after a thorough orientation in these methods, to select a definite school of thought or to absorb from all of them that which best serves his own capacities.

To accomplish this we need to fulfill two requirements: the separation and definition of the basic methods involved in the different procedures and the establishment of a clear relationship among them—a relationship which would permit their integration into a more general and complete system. This is the object of the present paper.

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Language and Interpersonal Relations

It is a commonplace statement to say that psychotherapy is nothing but a very specialized form of interpersonal relationship—a relationship in which the doctor acts upon the patient, trying to influence his thoughts and actions. A human being is able to influence another human being in a direct or an indirect form. In the first case we are dealing with the personal relationship between man and man, between physician and patient. In the second case such action is characterized by the employment of an intermediate link between them: the psychotherapist acts upon his patient not directly, in his person-to-person relationship, but by means of an instrument which can vary *ad-infinitum*.

In the study that follows, attention will be paid fundamentally to the first method—direct psychotherapy. What can be learned in this way may be applied easily to the other methods. If one studies the direct relationship, one is forced to consider the means by which a human being can act upon another. It is, undoubtedly, by means of language that one man influences another, that the doctor acts upon the patient; therefore, we have to direct our attention to language itself, its meaning and ways of action. We will spare the reader a review of all that has been written about language, and restrict our remarks to one important aspect of the problem.

Karl Bühler, in a fundamental study (1), states that language has three functions: appeal-function (Appellfunktion), expressive-function (Ausdrucksfunktion) and connotative-function (Darstellungsfunktion). He says: "Language is a *symbol* because of its relevancy to objects and relations; it is a *symptom* because of its dependency on the speaker giving expression to his inner self; it is a *signal* because of its appeal to the listener, whose internal or external behavior serves as a guide, as do other traffic signs." Perhaps these are not the only functions of language. Fliess (2) describes other possibilities, but we believe that, funda-

mentally, they may be included in the three groups mentioned above.

It would seem that those three functions are, really, three stages of an evolution. The first language, common with some animal species, has undoubtedly a function of appeal. It is the calling cry, the asking for help and, therefore, the stimulus to approach. It is, if we allow ourselves the deduction, the beginning of an emotional relationship between individual and individual. It is not difficult to imagine that language could have been born out of the need for the emotional relationship with a fellow creature. The most primitive signs (perhaps not to be considered as language) of animals are calls to an individual, usually of the other sex. In another stage language serves as a means to express precisely those emotional reactions and to, somehow, communicate them to others. The third step, which seems to be reserved exclusively to the human race, is a very late development and is the basis of language as a powerful means, not only of understanding the world around us, but of mastering it.

A further exploration of the fascinating field of linguistic research brings us to the work of Lain Entralgo, who completes Bühler's exposition. We consider Lain Entralgo's conclusions so important that we are quoting them *in extenso* (3):

"I believe Bühler's approach admirable but incomplete. It tells us all what speech means to the listener, but not what it means to the man who speaks. Müller Freienfeld has previously emphasized an 'exonerating function' or 'discharge function' (Entladungsfunktion) of language, a function that cannot be included among those described by Bühler. But there are others. An attentive examination of the matter allows us to distinguish three other particular functions in the meaning of speaking for the psychological intimacy of the speaker himself. They are, somehow, the 'subjective' or 'intimate' correlation of the ones described by Bühler from the 'objective' or 'worldly' point of view.

"a. The *sodalic function* (from *sodalis*, fellow) or companionship function. In the eloquent intimacy it corresponds to Bühler's 'appeal function.' Calling the fellow creature we not only invoke him. The caller achieves for himself the function of giving and receiving company which is phenomenologically different from the appealing itself. Each appeal has a qualitative different solalic value.

"b. The *appeasing* or *cathartic function*. This function of speech regarding which reference may be made to Müller-Freienfeld's Entadungsfunktion, is the subjective correlation of Bühler's expressive or notifying function. To say something to somebody is not only (outwards) notification, but to the intimacy of the notifier (inwards) is also a cause for affective leveling. for appeasement.

"c. The *clarifying function* or function of internal articulation. It is, towards the intimacy, symmetric with the representative or connotative function. Naming what can be nominated—direct, metaphoric or interpretative nomination—the man who does it clarifies his inner world. This happens by means of successive configuration, articulation and ordination of the content of consciousness. Elocution always clarifies the speaker as teachers well know."

We face, then, a series of possibilities that language offers to interpersonal relationships. But Bühler and Lain Entralgo dealt specifically with the language of words. It may serve to complete their exposition to say that as regards language *we do not refer exclusively to speech, but to all the manifestations fulfilling the functions we have studied.* As well as words themselves, gestures, attitudes and all the means used in appealing, expressing or nominating or to fulfill the sodalic, cathartic or clarifying functions have real importance and deserve to be considered as language. There is something more. It may appear paradoxical in the consideration of language to refer to something wholly antithetic: silence. This, however, requires consideration.

The Function of Silence

The great value of silence in interpersonal relationship is well known. This is a very important factor, but we will limit ourselves to a few observations.

As always, unconscious wisdom anticipated scientific knowledge in this field. We must remember that the Greeks had a god of silence: *Harpocrate*. It seems that the representation of this god was a mistaken adoption of an Egyptian deity. Among the Egyptian religious images there is one with the figure of a child standing with a foot forward and with a finger in front of his lips. He was *Harpakhrat*, Orus the child. It seems, according to those who have investigated this subject, that the Greeks took this image and, interpreting the attitude erroneously, applied it with the spurious change of name, to the god of silence. One of the attributes of the god is a branch of a variety of the peach tree (alberchigo) whose leaves, quite characteristically, look like a tongue. Romans changed the sex of Harpocrate and

created several godesses of silence: Lara, Tacita and Angerone, among others.

If we go further in this curious historical search we discover another very interesting detail. The same tree, a branch of which is always a part of the representations of Harpocrate, is the very same plant consecrated to Hippocrates, the father of medicine. Thus the Greeks, from the deep symbolism of their theology, give us a magnificent lesson, linking the god of silence with the god of medicine.

Artists were always aware of the value of silence. Its importance in poetry, in the theater and especially in music has often been referred to. However, in connection with psychotherapy, there are relatively too few studies. It is the psychoanalytic method, with its emphasis upon the silence of the analyst, which has brought to the foreground the real importance that silence has in the interpersonal relationships. Meerloo (4) describes the possibilities of psychoanalytic interpretation of silence, pointing out its meaning in connection with the different stages of libido development expressing themselves through it. He speaks of an oral-erotic, urethral-erotic, anal-erotic and genital silence, as well as "the silence of the womb," a transference silence and the one due to repressed aggression.

Theodor Reik (5) considers different degrees of silence as well as different meanings of it. "Compare, he says, for instance, 'silence gives consent' with the rejecting silence of a lady to a man who is forward or objectionable." He reminds us about the characteristics of ancient languages, the Egyptian, for example, in which the same word may have anthitetical meanings. He quotes Carlyle as saying: "Speech is of time; silence is of eternity." We would add that what Carlyle said was really "silence is deep as Eternity, speech is shallow as Time," which increases the beauty and deepness of the phrase, and that Lacordaire wrote: "Le silence est, après la parole, la seconde puissance du monde."

Going farther, we will apply to silence the concepts of Bühler and Lain Entralgo. *There are appealling, expressive and connotative, as well as sodalic, cathartic and clarifying silences.* However, to accept this statement it is well to make some qualifications. If silence is language, it is a passive language. Its value lies not in itself, but in the moment at which it appears. The real function of silence rests in what has just been said or in what is not yet spoken, but, be it as it may, the language of silence is as important as the language of words or gestures—sometimes, more.

Language and Psychotherapy

To return to the relationship between language and psychotherapy: if we assume that language, in the broad acceptance we gave this word, is the supreme means of interpersonal relationship, and if we accept also that psychotherapy is essentially an interpersonal relationship, we must inquire as to how psychotherapy uses language—an inquiry which may give us a starting point for a fruitful research in the very foundation of psychotherapy. One question presents itself immediately: Have the functions of language as just considered any direct relationship to the methods of psychotherapy? We believe the answer to this question may open an original path in the research of basic psychotherapeutic methods and the possibilities of their systematic application.

If we were able to find a clear relationship between the functions of language and the methods of psychotherapy we would have, undoubtedly, a scheme of classification based, not on limited conceptions of school or procedure, but on the roots of every psychotherapeutic possibility: the functions of language. Let us examine those functions to see whether they lend themselves to such a systematization.

We have, to begin with, the *appealling-sodalic* function. We know already its principal characteristics: the establishment of an emotional relationship between the speaker and the listener. The man who speaks is seeking actively such a relationship. The precise word used by Lain Entralgo expresses this clearly. The one who speaks for the establishment of an emotional relationship between the speaker and the listener. The man who speaks is seeking actively such a relationship. The precise word used by Lain Entralgo expresses this clearly. The one who speaks calls for the establishment of an affective relationship with another human being. The one who hears the call does so on the same level of personal relationship—that is, upon an emotional or

TABLE 1.

Functions of language		*Psychotherapeutic methods*
Bühler	*Lain Entralgo*	
1. Appealling function	Sodalic function	Emotional relationship
2. Expressive function	Cathartic function	Catharsis
3. Connotative or nominative function	Clarifying function	Insight
4.		Working-through

affective basis. If we consider these facts from the point of view of psychotherapy we realize that this function of language, urgent and decisive, has a direct correlation with the most important of the psychotherapeutic methods: the *emotional relationship*. There is no doubt that the emotional relationship (be it called rapport, transfer or what not) and its management are the bases of every psychotherapeutic procedure.

Speaking of the *expressive-cathartic* function of language we refer to another psychotherapeutic method: *cathartic*. If we follow this line of thought we ask ourselves: Is there also correlation between the *connotative-clarifying* function of language and another psychotherapeutic method? The answer is yes. It corresponds to a very important procedure: the *insight*-producing techniques.

Thus an interesting parallel has been found between the functions of language and the methods of psychotherapy, but we must ask ourselves now: are there no other methods than to establish an emotional relationship, to provoke catharsis and to give insight? Study of the literature and personal experience allow us to reply in the affirmative. There is only one exception. A procedure of such a decisive importance as *working-through* has not been considered so far. We do not feel obligated to change our assertion for this reason, because we believe that working-through is nothing but the synthesis of the other three methods, a combination of them and harmonization of their results, allowing the psychotherapist to use them more effectively.

Table 1 will serve as synthesis and basic scheme:

We believe that the consideration of those ideas may give us a new basis upon which an interesting study of the foundation of psychotherapy can be grounded with the aim of arriving at an understanding beyond the partialities of schools or procedures.

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A PRACTICAL CLASSIFICATION FOR EMOTIONALLY DISTURBED CHILDREN TREATED IN A WELFARE SETTING

J. A. BARD, R. T. SIDWELL AND J. M. WITTENBROOK, M.D.

Diagnosis of psychopathological problems does not support its share of the burden in the welfare handling of emotionally disturbed children. This is probably due to the fact that there has never been a completely satisfactory definition of what is psychopathological. Where medical diagnosis is rooted in a thorough understanding of anatomy and physiology, psychological diagnosis has never been rooted in a similarly concrete body of knowledge. At the present time it appears that such a body of knowledge can only be substituted for by a theory of personality, but this has not yet been done. Psychological diagnosis has not yet been founded upon personality theory, but continues instead to differentiate among conditions primarily on the basis of symptoms or behavior. The obvious deficiency here is the lack of utility in the diagnosis. A diagnosis of appendicitis, while never completely above question, tells something about the condition that can be used to plan treatment. A diagnosis of emotional disturbance indicates no definite treatment, although it vaguely suggests that the individual ought to have psychotherapy of one kind or another. In other words, such a diagnosis contributes very little, if anything, to the development of a treatment plan.

To some extent this deficiency has been compensated for by careful evaluation of the case history which may yield a wealth of information about the etiology of the condition. This appraisal may yield an accurate survey of the circumstances responsible for the pathology and, in addition, may even point the general direction for treatment planning. It still falls short of what is needed, however, and what is here believed to be possible. Diagnosis in the area of psychopathology among children should provide a sufficiently coherent picture of the pathological condition that certain definite treatment plans are clearly indicated. In order to do this we must add to our consideration of the symptoms and the developmental history a third consideration, namely, an appraisal of the contemporaneous structure of the personality which is subject to illness. The symptoms, which are the first indication that pathology exists, cannot be adequately explained in terms of trauma which occurred during the developmental period. One may understand that an aggressive child behaves as he does because of early and severe rejection, but this does in no way suggest a method for resolving the aggressive feelings. We are proposing that human beings of all ages suffer from emotional problems because of what they are at the time of suffering, not because of what has happened to them in the past. It is obviously true that what they are has been determined by what they have experienced, but a knowledge of the experience does not, unfortunately, adequately describe the suffering personality. Without a more thorough understanding of the personality structure at the time of diagnosis, welfare planning for the emotionally disturbed child can never be more than a hit or miss procedure at best.

It is not our intent to ignore the great strides already made in the area of personality theory. It has been demonstrated time and again that a competent psychotherapist can, over a period of time, very accurately describe the balance of intra-personal forces that, at any given moment, cause certain behaviors to occur. It is rather our intent to suggest that a similar level of understanding may be achieved without the costly and impractical employment of the psychotherapist as a diagnostician, by bringing theory and diagnosis together.

Diagnostic categories are generally based upon one or both of two possible considerations, symptoms and etiology. The obvious difficulty here arises from the fact that identical behaviors may have strikingly different causes

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and identical causes may result in strikingly different behaviors. If diagnostic categories could be based upon a theory of personality structure, then the symptoms and etiology could assume their proper role in the overall evaluation of the condition. For example, if, in evaluating the stealing of two boys, we know that the behavior is conflict-motivated in one and need-motivated in the other, we are in a relatively favorable position to suggest some constructive disposition of the behavior itself. Neither the symptom nor the case history is adequate to determine the motives underlying such behavior. This can be conclusively established only from an understanding of the structure of the personality itself.

The case in point offers a suggestion for the establishment of a diagnostic criteria. The child whose behavior we have called need-motivated is the child who takes an apple to satisfy a hunger need or a need to possess, etc. He may proceed cautiously in the knowledge that unpleasant consequences follow detection. For him, however, there has been no crime unless he is detected. This is not necessarily the so-called psychopathic child. It may be the child whose introjected standards have been adopted from adults who reflect a similar attitude toward possession. Regard for the property rights of other persons is not part of any value system held by this child. On the other hand, a child who steals as an expression of conflict probably does so at considerable expense to himself because at least one area of his value system is opposed to the behavior. In distinguishing between these children and the reasons for their identical behavior we have considered the value systems or standards of both. Neither behavior nor the case history can adequately describe the value systems of these children, although they may contribute to this description.

We propose that a system for classifying or diagnosing emotionally disturbed children can and should be based upon a theory of personality or at least upon a foundation of systematic concepts that might be derived from personality theory so that diagnosis can offer at least an hypothesis about what needs to be done. So far as personality is concerned we find that the various theories generally postulate the existence of a restraint system which stands in opposition to the free and indiscriminate expression of needs or impulses. In the orthodox psychoanalytic formulation the restraint system or superego is conceived of as a relatively static structure which is essentially prohibitive in nature. The more positive concepts of a regulatory nature are posited as ego-ideal. Whatever the absolute distinction between superego and ego-ideal, it is generally assumed by any theoretical position that a system of values exists as a part of the structure of the personality. We shall avoid using the term superego and speak rather of standards and/or values. Standards are said to be introjected during the individual's developmental period as a function of the relationship between parent and child. This does not exclude the possibility of standards being introjected in relation to other persons of significance to the child. It merely recognizes that the parents are in the most influential position because of the child's complete dependency upon them. It may occur and does that a child whose dependency is not adequately met by parents will introject the standards of those persons outside the immediate family who more adequately meet the dependency needs of the child. This whole area needs a great deal more consideration than can be given here. We are primarily concerned for the moment with the standards themselves as they may lend themselves to our purpose of classifying emotionally disturbed children.

Among children in general there seem to be differences of kind and degree in the standards which they observe and which can be said to be integral segments of their personality structure. There is, for example, the child whose standards are extremely minimal; whose behavior is relatively uninhibited; and whose feelings about the uninhibited behavior are free of any particular remorse or anxiety. There is, at the other extreme, the child whose standards are so complete and oppressive that only the most cautious expression is permitted. On the basis of the kind and degree of standards introjected we propose that children can be categorized as *healthy, asocial, psychoneurotic,* and *anti-social*. Although holding some notions about the standards involved, we have deliberately omitted the psychotic child and the so-

called psychopathic child from this consideration. It is possible that an evaluation of these personalities, from the standpoint of standards introjected might yield some significant information about the conditions themselves. For the time being, however, we are primarily concerned with classification and these conditions have already been distinguished.

Although these categories are essentially descriptive in nature, some hypotheses about the genesis of the conditions involved may help to clarify the description itself and further, to point the direction for future research.

Aside from the many other considerations to be made, the *healthy* child appears to have introjected the standards of his culture as they have been represented to him by his parents. The relation of standards introjected to basic needs or impulse life is such that the standards, while opposed to uninhibited expression, actually serve the basic needs of the child by providing him with a consistent frame of reference, observance of which helps to direct behavior in such a way that continued gratification of basic needs can be obtained. The parents of the healthy child are probably best described as persons who promote the introjection of standards because of a sincere interest in the welfare of the child and who are, therefore, able to provide a consistent pattern of satisfaction for the child. In addition, this child, although perhaps initially confused when placed in a new situation, can learn very quickly appropriate behaviors because of the previously established effectiveness of the learning process.

The *asocial* child is best described as a child with no appreciable kind nor degree of standards. His expression of needs is direct and relatively uninhibited, although he may conform to certain realistic limits so long as they are enforced by external reality. He cannot be counted upon to enforce these limits himself, because the limit is not part of his system of values. There is no particular remorse nor guilt about violations of cultural standards because these are alien to him. In fact he may react quite violently when cultural limits are imposed upon him. This child is frequently labeled emotionally disturbed because of his reaction to limits which frustrate the direct expression of his needs. He is not, however, disturbed within himself. He is disturbed with his environment.

The background of the asocial child is probably marked by a poverty of structured social experience. This child may be known as the neglected child who is physically and emotionally deprived. There has never been any encouragement to introject cultural standards because the parents, having no particular feeling about these standards themselves, do not apply them in in their own day-to-day living. In relation to the parents, this child receives food and shelter and, many times, at least very early in his experience, some love. When he becomes mobile, however, he is left to his own devices and, with a minimum of support from his environment, survives. Frequently this child does not pose a problem until the culture outside the home begins to make demands, e.g., the school system. The idea of meeting as many standards and expectations as are demanded by the school system is, of course, overwhelming to this child and his frustration may be expressed in what appears to be serious emotional disturbance.

In contrast to the asocial child whose personality shows a minimum of structure and whose behavior is a fairly direct expression of need, there is the *psychoneurotic* child whose personality structure is rigidly defined and whose behavior is frequently conflict-motivated. This child cannot express needs directly because of the rigid demands of his restraint system or standards and what is seen on a behavioral level is a compromise action which usually satisfies neither the need nor the demands of the value system. It is suggested that the parents of the psychoneurotic child have encouraged the introjection of standards primarily to serve the interests of their own unmet emotional needs rather than the interests of the child. Limits and standards are, therefore, a function of the parental mood and may have very little relation to objective reality. The child is able to avoid disapproval by observing the limits set down, but positive satisfaction of his own needs is highly erratic. There is, however, never any apparent basis in reality for the child's feeling of frustration so he is completely unable to attack the source of his problem. He cannot openly criticize the parents because there is no tangible evidence of their

inadequacies, so his resentment provokes self-deprecation and feelings of guilt. On a very general level, the symptomatic behavior of this child is much more self-destructive than environmental-destructive. He turns resentment and aggression upon the self. Even though much of the behavior may be destructive to the environment, its purpose is ultimately self-punitive.

The *anti-social* child is basically psychoneurotic in the sense that the behavior is conflict-motivated. The major distinction here is based upon the aim of the destructive behavior and with the anti-social child, this aim is destruction of the environment. It seems as though the conflict involved is more complex than just needs opposed by standards. These children are actively and constantly motivated to destroy existing social structure to an extent that betrays some more constant intention than basic need-satisfaction. The conflict seems to arise between opposing value systems which indicates that more than one set of standards has been introjected. Beneath the hostile and purposefully destructive exterior, one may catch glimpses of positive feeling which betray the existence of a deep-lying residue of socially acceptable values. The child's reaction to any appeal made to this deeper-lying value system quickly reveals the nature of the conflict and the purpose of the anti-social adjustment. Hate is an effective defense against love. This child becomes most violent and destructive when he is in danger of giving in to his own desire to be an acceptable person. The retaliation against him for his destructiveness then justifies his feelings of hatred and makes it possible for him to satisfactorily quell the uprising within himself.

It is possible that the anti-social standards are introjected and superimposed upon earlier, more acceptable standards, as a defense against these earlier standards. It may occur that the parents of this child have encouraged the early introjection of standards for their own exploitive ends. How different this parent might be from the parent of the psychoneurotic child would be difficult to say. It may be that this parent merely uses cultural standards which he has never introjected himself as a means to exploit the child. It is suspected that there is tangible evidence of the exploitation so that the child directs his feelings against the parent and ultimately against society in general.

The validity of these distinctions remains to be established. So far they represent hypotheses to be evaluated. The most feasible approach to such an evaluation would seem to be an experimental analysis of children's value systems which could be predicted to yield at least as many distinguishable patterns as are represented in the classification. Even without such a validation the general framework seems workable. There are, for example, fairly definite inferences that can be drawn from any of the categories concerning the most efficient treatment plan. In considering the asocial child it is fairly clear that some form of treatment is necessitated by the seriousness of his behavior. The fact that this child suffers from a lack of personality structure makes it pointless to refer him to a psychotherapist in an outpatient clinic. If psychotherapy can be conceived of as both analytic (in the sense that it exposes the underlying forces that constitute the conflict) and synthetic (in the sense that it provides for the learning of more constructive patterns) then it is obvious that any therapy for the asocial child needs to be primarily synthetic. This child can undoubtedly be satisfactorily handled in a high-quality children's home which provides a great deal of structure and support for him. To place the anti-social child in a similar setting is to court disaster, for this child needs freedom in a carefully-controlled setting which can protect him against the retaliation which confirms his problem. The treatment of this child has been very adequately described by Redl. The psychoneurotic child whose parents are unable to change themselves will probably have to be placed in a residential setting which can provide both the analytic and synthetic aspects of treatment referred to above. Some attention should be paid to the damage which may result from indiscriminate mixing of these children in the same setting. The psychoneurotic child, for example, may very readily adopt an anti-social orientation, if provided with that kind of stimulation and suggestion.

In the final analysis these categories are not absolute. They should be recognized as the abstractions they are; as guides to planning, not disease entities. With greater understand-

ing of personality malformation we may be able to describe these conditions as disease entities. For the time being, this system is submitted as a step in the direction of better and more efficient planning for the emotionally disturbed child so that he may be provided with the best treatment for his particular problem.

THE STATES OF BEING AND AWARENESS IN NEUROSIS AND THEIR REDIRECTION IN THERAPY

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In psychotherapy today the major emphasis is placed on content. In general, the objective would seem to be for the patient to attain awareness of attitudes, differently acquired according to the various schools, which no longer serve his best interests. Free association and the therapist-patient relationship are tools with which to achieve this objective and are subordinate to it.

Alongside this development there have been currents in psychotherapy with little emphasis on content or in which content has been employed differently. These are less easy to classify but in a rough way may be divided into two kinds. In one the aim is to direct the patient's awareness to body tenseness or muscle patterning. The procedures followed may not be imbedded in any elaborate theoretical framework, though the relief that follows is said to be psychological as well as physical. Among the technics employing this approach may be mentioned those advocated by Jacobson (6), F. Matthias Alexander (1) and perhaps Reich (11). In the second kind, content, with none of its importance reduced, is nevertheless used for attaining something thought to be more crucial. Rank (10) early replaced content with the therapist-patient relationship as the dynamic force in therapy. He also recognized neurosis primarily to be a problem of the development of consciousness. Moving also in the same general direction have been some of the teachings and practices of Eastern philosophy, according to such students of the subject as Watts (12), as well as, more recently, the application of gestalt theory to psychotherapy as attempted by Perls, Hefferline and Goodman (8).

This paper deals with some theoretical and practical formulations for psychotherapy which resemble those of the last mentioned authors. More specifically, it is the objective of this paper to explore the possibility that in neurosis:

1. There has been an impairment in the reciprocal relationship between what we shall call for the moment the larger unconscious whole of the personality and its smaller conscious part, and a tendency to shift to the latter aspect as a basis of operation. The purpose of therapy would then be to repair this impairment and reverse this shift.

2. Free association and the therapist-patient relationship are means of reversing this shift, but are themselves intrinsic parts of the process of therapy.

It is also thought that the present formulations add to the understanding of some concepts often used in psychotherapy, such as alienation, faith, spontaneity, growth and some others.

This paper is divided into four parts. Part 1 deals with the theoretical aspects; part 2 with their possible clinical significance; part 3 with the goals of psychotherapy in the light of these formulations; and part 4 with some technical points. Pathogenesis is not considered, though a beginning formulation has already been attempted elsewhere (13).

1. Theoretical Aspects

It is important first to recognize the difference between being, on the one hand, and consciousness or awareness (used interchangeably) on the other. (There are difficulties in the use of all of these words but it is thought that their meaning will become clearer through the context rather than by entangling definition.) Being, as such, excludes awareness; that which is in awareness is an extrusion of being, separated out of it, and, as it were, appearing on its surface or periphery. For the moment that something is in awareness it is alien to being. To put it differently, the being does the awareness and cannot be aware of itself at the same time. The following may illustrate the point: as long as the stomach is part of the individual's normal functioning or being, it is not in awareness. If it malfunctions and gives pain, it becomes the object of the rest of the indi-

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vidual's awareness. Furthermore, the being is the reservoir, the whole of the person, and that part of which it is aware is its product and that of the environment, and disappears within it as other awarenesses succeed it. Being is like the ocean and awareness its outgoing and incoming waves.[2]

The relationship between being and awareness needs to be considered further. Being is more or less constant while awareness is a continually changing phenomenon resulting from the impingement on being of the continually changing internal and external environments. Awareness is essentially, each time, a different phase of the organism in action—that is, how and what the eye sees, or the stomach feels or the "mind" thinks will be according to the nature of the whole person. At the same time the organism in turn is affected by the changing awareness, probably concurrently as awareness emerges and as it disappears into unconsciousness each time. This effect of awareness on being may perhaps be ever so little at certain times and be much greater at other times, depending on the nature of the interaction, but being cannot remain unaffected. In gestalt terms the process may be best described as the interaction between ground and figure, with ground itself changing to produce changing figure.

In this interchange between ground and figure it is predicated that no other energies (or "will") need be mobilized. The dynamism is the product of the inherent excitability of protoplasm and the energies of the environment.

Several principal assumptions may now be made as to the functioning of the healthy individual in terms of being and awareness.

1. The healthy individual is more or less identified with being. In a sense then he is whole and consistent. His major functioning is therefore unconscious, about which more will be said later. He is organic. He need no more direct his intellectual functioning with one part of himself than he need direct such other functionings of his as breathing or heartbeating. The more he surrenders to himself, the more he surrenders to his functioning and the more he becomes his functioning. The more he becomes the functioning the more effortless it is.[3]

2. Awareness connects being with the "here and now." The here and now is meant not only to include time and place but also the organism's experience up to that point with what confronts it in the here and now, and what is relevant to the here and now, including consequences, values, goals, etc. The organism can be totally in the here and now only to the extent that it is unconscious of itself, viz., that it is in a state of being unrestricted by set awareness. The release of the organism from any part control within it (which is consciousness) makes it possible for it to be completely influenced by that which impinges on it in the present, and to produce a figure which is most relevant and appropriate for the organism in that environment.

3. As long as the individual remains identified with being, decision for action is a function of being and not of awareness, and up to the point of execution, unconscious. (Action itself is included in awareness.) Decision is here regarded as a neuromuscular reaction and occurs only as the result of a total reorientation of being. Two examples may clarify this point. An individual is awakened by the alarm clock. He knows he has to get up but he is still sleepy and tired. Thoughts of the importance of getting up in time pass through his mind—catching the train, making his appointments, etc. He feels his tiredness. Other thoughts, apparently irrelevant to his getting up, also come up. Suddenly, that is not preceded by any conscious decision to do so, he gets out of bed. The second example: A 37-year-old man has not been able to drive a car for some 18 years although he has had a driver's license for as many years. After six months of therapy during which time many of his problems were taken up as well as his inability to drive but without uncovering any specific reason for it, he buys a car and drives it. He knows no better now why he couldn't drive before nor why he can now.

Knowing the appropriate action doesn't

[2] This is not different from William James's stream of consciousness concept except that the experiencer of the stream and its phasic content are especially dealt with here.

[3] Predicating the healthy individual as identifying with being obviates the difficult psychological (and philosophical) problem, How much of myself am I? Such a question is based on the premise of the identification of "I" with consciousness.

necessarily lead to execution. People often ask themselves after the fact why they had not taken certain obviously indicated steps of which they were fully aware. On the other hand action taken from awareness may seem appropriate one day and totally inappropriate the next. It is a common experience among individuals with neurosis to decide carefully on a course of action and to regret it the moment after it is executed.

The difference between acting from awareness and from being may come out in certain physiological functioning, like defecation or parturition. Although aware of them as developing ends, these acts will be impeded if the individual deliberately tries to expedite them instead of allowing inner bodily changes to occur by themselves for their execution. Similarly, individuals intensely aware of everything they do may find it difficult to carry out the simplest acts, e.g., a college graduate who couldn't give the correct change out of a five-dollar bill; a Phi Beta Kappa graduate who got confused doing the simplest household chore.

4. In the individual who is identified with being there is free interplay between being and awareness. The release of the organism from any restrictive internal controls allows being's reaction to the environment, awareness, to be complete; in turn, the resolution of awareness back into being can be complete. Awareness may then modify being and play its part in decision and new awareness. There is thus change in continuity which is growth. This is to be differentiated from reflex response, which is best elicited when the rest of the organism is distracted, or from "thinking out," which is making available for participation only certain parts of the organism by some other "supervising" part and according to some predetermined pattern or "logic". In either case there results a part that has reacted and a part that has not reacted. There is thus division and accumulation of tension, which are absent when all of being has participated fully in determining the emerging awareness.

These two ways of functioning may also be seen in terms of Lewin's field forces (Frank (2)). Awareness would be the resultant of the forces operating on the organism from within and without, as against an accumulation of potential which would of necessity build up in the organism its opposite or ambivalent force.

5. The concept of the healthy individual as one who remains with being while permitting free interplay between being and awareness may be expressed in another way. One may say that what the individual is really doing, at any one time, is polarizing his unconscious functioning in accordance with the here and now, and, over any stretch of time, making his conscious unconscious.

What is crucial then for healthy functioning is the individual's complete release of himself to himself, allowing himself to become whatever the internal and external forces determine. Whatever comes up from within or from without is purely phenomenological and exerts an influence on being by what it evokes, per se, without any intervention on the part of any subdivision of the organism. Because the individual is thus totally involved, no one part of him determines the outcome. The outcome is in fact unpredictable. It is in this way he learns what faith really is, the logic of the organism that is he and its deep preference for the healthy. Just as he doesn't have to have his breathing or walking predictable, so too the interplay of being with awareness will occur according to its own most valid logic.

2. Clinical Significance

A neurosis may be looked at as a disturbance in the being-awareness relationship. On the one hand, there is no longer more or less full identification of the personality with being; on the other hand, there is increasing identification with awareness. This state of affairs has many manifestations.

The individual cannot trust himself to a new outcome according to the newness of each moment of his living. He must therefore have fixed ways from which to operate, and generally constricts his field of operation. The fixed ways are the fixed attitudes of the individual and the nature of the predominant ones give the coloring to his "character structure" (e.g., the typologies of Freud (3), Fromm (4), Horney (5)). Within these attitudes the content itself may be quite rich, emotional and give an appearance of being spontaneous. But it is essentially predetermined, and lived like an actor's part, instead of being each time a new creation according to the forces at play

within and upon the individual at any one time. Usually the content itself is also constricted.

There is a general adherence to the past or a failure to move on to the new. The patient justifies this by what happened in the past. In therapy it may often come up in the patient's reverting to one or two incidents as crucial. In some patients the words themselves may be repetitious from one session to the next. In these and other ways the individual is indicating his sense of being static and of necessity tied to the past.

Equally important is the fact that the individual doesn't grow, no matter how varied or potentially rich his experiencing may have been. The individual has never really let his experiencing affect him; it was accumulated, as it were, and no matter how extensive or abundant, has remained essentially outside the personality and has not changed it. Clinically this is seen in the general immaturity which characterizes all neurotics side by side with physical aging and sophistication in this or that aspect. Subjectively the neurotic feels younger than his contemporaries. There is also indecision and inconsistency because his full experiencing has not and does not play its part in each act of his living. It is perhaps in this way that alienation is to be understood, that each act of his living is not a new outcome each time of all that he is, but either only a part of what he is, or to a large extent a result of fixed attitudes. The emotional range in any act of an individual's living would then depend on how much of himself is involved anew in it, each time he lives it.[4]

As a result of his experiencing being an accumulation and not a continual becoming and changing, the individual is subject to increasing strain. He must keep himself circumscribed and guard himself from fully letting go toward further experiencing. The neurotic individual has difficulty in initiating action, though once begun, he may do quite well in it. (This is to be differentiated from what occurs at the opposite end of the being-awareness equation, when the individual operates even more from awareness, in which case he may initiate easily but carry out very superficially.) He may resent other people's relative freedom of action for one reason or another, e.g., their being "pushy," "inconsiderate," "selfish," etc. He may attempt to control others.

He must hold on and have access to his experience very much like a school boy must hold on to information he crammed in the night before an examination in place of digesting and metabolizing it in the course of the year. He feels uneasy. He must keep himself together lest he fall apart, "... almost as if I'm holding my breath and afraid to let go," according to one patient.

He must consciously match appropriateness of reaction to new experience. This too makes him fearful of entering upon a new experience. This may be especially marked in the case of the neurotic adolescent, faced with new situations and people. He tends to avoid them because he is afraid he wouldn't know what to say or do, that he will make a fool of himself or that people will laugh at him. This may be present regardless of the amount of actual social experience such an adolescent may have had.

There is a general hyperawareness of oneself in relation to others. This the neurotic individual experiences as "self-consciousness" and he often expresses the wish to be rid of it. With other determinants (e.g., self-hate), it may be externalized to one's functioning (feeling inept, clumsy), or to one's appearance, overemphasizing slight bodily differences (e.g., of nose, ear, scarring due to acne) to momentous proportions. (Its projection to others and inanimate objects, and events may possibly be a factor in the production of ideas of reference.)

It is these and similar operations that may be responsible for much of the anxiety from which the neurotic individual is suffering. (The general fear of "letting go" may be imbedded in different context—fear of growing up, giving up one's dependency, shattering one's idealized image of oneself etc.) Theoretically he may cope with this increasing anxiety by further organizing himself, which will give him some consistency and a kind of controlled "automaticity." (This would be in line with a general compulsive need for organiza-

[4] The more the individual gives up control and the more he is involved in what he does, the more the "I" of the person is the involvement and the less the alienation.

tion seen in many neurotic individuals. They cannot leave things open, undecided, but must have an answer and close every gestalt, no matter how forced.) But the very further attempt at organizing means a shift to further identification with awareness. The individual seems to act only from mind. Psychotic individuals often give expression to feelings which it is tempting to use as descriptions of what may be going on in such instances. One individual said that he felt dead all over but alive only in his head and afraid that it would spill over. Another thought the thumping of a washing machine was his heart beating.

At the further end of the being-awareness equation may possibly be included cases of phobias and obsessions. It is almost as if the organism to protect itself must substitute some form of control against mind and immediate action, for to such an individual mind and thought are more and more reality and action. The phobia or the obsessive act would then be a symbol of limits and control.

This formulation also allows some understanding of certain schizophrenic symptoms though it is not meant to imply that it "explains" the process. Acting from awareness and no longer from their total organic being, they bring up their alienated organic being as hypochondriasis. (Similarly with the schizophrenic's understanding of dreams.) It may also explain part functioning (e.g., impulsiveness, verbigeration) of the deteriorated schizophrenic, since he no longer operates from being or total functioning. The further organizing of awareness into a kind of artificial "being" with which subsequently to metabolize experience including his own past experience would resemble the state of affairs seen in the paranoid states.

3. Goals

From the above formulation of neurosis it follows that the goal of therapy is to make it possible for the individual to identify with being. This has several corollaries.

It has the objective of helping the patient gradually give in to his functioning and release the parts under control to the whole of himself. He can thus more and more become his functioning.

As part functioning takes a subordinate place in a field of other forces, its compulsive nature is diluted. Fixed attitudes and obsessive formations are modified as decision and action is determined each time anew by the totality of forces at play.

Apart from the specific content of these forces they acquire two general characteristics. One is their being shifted to the present. As the individual give in to himself, being is polarized about the present by the awarenesses that succeed each other and this includes the individual's life experience. The individual learns to become available to himself in the present. That is the real meaning of the here and now. It is a biological phenomenon, in that the individual can release himself to the present and allow the forces acting inside of him and outside of him to form an entirely new outcome which, as already indicated, he cannot completely predict. The unpredictable element of the outcome is a crucial characteristic of the here and now.

The second general characteristic of the forces constituting his functioning is their operation before another person. Heretofore his relations to people were such as to keep him alert and watchful. He could not therefore let go of himself completely for any outcome that the immediate present and immediate configuration exclusively would determine. In the patient-therapist relationshp he can. With a gradually growing feeling of being safe, he can let go with his fears, irrationalities, hostilities, etc., and again experience identification with being. This would not be possible without the presence of another person, nor if that person were any other than the therapist.

It is important to note at this point that what is crucial is not the analyzing of the fears or irrationalities but rather their full emergence so that they will become part of the configuration forming in the present. Interpretations which do not primarily forward the patient's releasing control over himself might not serve this purpose.

As in the case of faith and the here and now, creativeness and spontaneity are biological phenomena. By the individual's identification with being and its total interaction with awareness he is constantly becoming something new. Thus, however slightly each time, the individual is both creating and is the product of his creativeness. Similarly with spontaneity,

the releasing himself to inner and outer forces, without a part of himself held in reserve to keep him tied to the old configuration, makes it possible for him to come up with the unpremeditated.

The presence of the therapist and his inclusion in the configuration is an important aspect contributing toward the patient's maturing. The neurotic individual has up to this point in his life mostly reacted to people (e.g., Horney's "toward," "away," and "against" formulations), but he has never really fully allowed himself just to be with people, nor allowed them to play their respective parts in his life. This is seen in how little, and for how short a time, other people really have a positive influence on the individual with neurosis in spite of apparent closeness to him. As the individual allows himself to be himself, he can allow others to be themselves, and to include them as they really are in his configuration.

The individual's staying with being, as awareness merges with it, gives a biological basis for psychological growth. Growth is then not merely accumulation in mind but a total change. Putting it differently, the long-term objective of therapy is not to make the unconscious conscious, but the reverse, the conscious unconscious.

4. Technical Points

Some technical aspects of free association and the patient-therapist relationship, useful toward achieving the goal of therapy outlined in this paper, may now be discussed.

The usual ways of encouraging free association need not be gone into in this discussion, nor the difficulties often encountered. The objective of free association is ordinarily considered to be the uncovering of material for one reason or another not then available to the patient. The objective according to the theory described in this paper also includes complete surrender to oneself, to one's functioning (staying with being) through whatever comes up in awareness, before whatever person the patient may make of the therapist. Free association therefore becomes a much more comprehensive process (9). It includes not only verbal free association but also bodily feelings and functions, verbalizable or not. When the therapy situation otherwise permits it, an attempt is made to indicate to the patient that at times it may be less important for him to verbalize a feeling than for him to fully feel the feeling. In this connection it may be helpful to use a term like "amorphous" to indicate to the patient that the therapist recognizes that there may be bodily feelings that may not "say themselves" and counsel him to stay with them. An attempt is also made to get across to the patient to let the words come up from the feelings, and not to work hard at fishing for words, that is to allow an inner need to arise for speaking to the person before him, like waiting for hunger to arise as against the taking of food because it is lunch-time (though that could be one awareness in being for eating). Thus a fetish is not made of verbalization as such. It is important for the patient to know how much inner manipulation is going on in respect to verbalization, which he will often confirm when attention is called to it. Other manipulations may be quite apparent, such as kneading his brow to "think things out," or straining his eyes, or tensing muscles of arms, hands and jaw and those used in posture.

Often such phrases as, "What shapes itself out in you," "What forms or creates itself in you," may help; or "Feel it more," "Focus on it," "Let it spread out more," "Let it take you over," may get the idea across. Patients may get panicky and say they don't understand what is expected of them or that they can't do it. One patient said, "I've never really dared to let myself go like that."

Interpretations are generally geared to the same end, namely to indicate to the patient that what he is doing "makes sense," and encouraging him to give in more and more to his functioning. (The "rational" nature of his productions may best be communicated to him via content or psychodynamics.) Hostility, accusations, embarrassing feelings, sexual reactions to the therapist, in whatever other ways they may be dealt with, are also considered from the point of view of fears of the patient's giving up control over himself. Their coming into the flow of the patient's awareness and his staying with being is the primary objective.

As he gives himself over to the functioning

that is he, including all that he thinks, sees, hears, feels, remembers, prefers, hopes, (without intervention or "partisanship" in the outcome) several phenomena may take place. The order in which they will occur is not yet clear, nor which in one patient and which in another. There may be a tightening up of the facial musculature which is not unpleasant and which may spread to involve the whole body. The tightening-up may be followed by a feeling of drowsiness. More often the latter is preceded by a deep sigh or yawn and stretching. Sometimes this sigh or yawn is preceded by almost palpable anxiety which the sigh or yawn does not necessarily relieve.

More localized bodily states are common. Some patients may become aware of headaches which they were not aware of before the session; others may lose the headaches they came in with. Similarly with tenseness across the eyes, "bands" across the chest, tenseness over the abdomen. Some may sneeze and drain from the nose. One patient felt relieved from what had been a continuous "sinus" condition and could breathe easily through both nostrils during the hour, though the condition returned subsequently.

Other patients may begin to feel drowsy and actually go off into sleep, feeling greatly relaxed upon waking. A drowsy-sleepy phase will sooner or later appear in most patients.

These phenomena occur without conscious psychological insights accompanying them. It is of course known that they may occur in response to psychological insights.

The bringing to awareness of conflict and the patient's seeing and feeling the incompatible elements remains important. But its management is also aimed at furthering the patient's realization that no solution is possible by thinking and figuring out, adding up advantages and disadvantages. Only by letting conflict take him over, so that the resultant decision may come from his larger self, is there in a sense a "solution" (7).

An obstacle invariably encountered to the patient's identifying with being is a fear of what would happen if he should let himself go outside the therapy situation. It is here that an explanation of the general principle of field forces determining action in a particular situation is helpful. Giving concrete examples, the patient may be told that the more he gives himself over to the here and now of a situation, each particular situation will bring up its own forces in awareness for appropriate decision in being. Action would therefore not be from impulse or be simply reflex, but would have its own determining forces in the particular present which would take their place with the larger, continually enduring purposes of the individual's being.

Summary

Neurosis is discussed from the aspect of the identification of the individual with awareness and mind instead of "being" and unconscious functioning. Much of the symptomatology seen in neurosis can be based on such a premise. The objective of therapy is seen then not only as one of dealing with the content of the patient's productions but also as one of helping him to shift his functioning back to being.

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SOCIETY PROCEEDINGS

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

Meeting of January 20, 1955

DR. WALTER WEGNER, President, *presiding*

EXPERIMENTAL STUDIES OF BRAIN INJURY. *John S. Meyer, M.D. with the assistance of HM3 Ernest Martel.*

Experimental concussion, contusion, brain laceration and ischemia were studied in terms of local cortical oxygen availability (EPG), blood flow, pH, jugular venous pressure, intracranial pressure, blood pressure, respiration, EEG and steady potentials (S.P., D.C.)

Systemic arterial oxygen saturation was measured photoelectrically. Cortical oxygen availability was recorded with the polarograph described by Meyer, Fang and Denny-Brown. Microglass thermistor electrodes indicated cortical blood flow. S.P. (D.C.) potentials were measured with a D.C. millivoltmeter and D.C. amplifier.

Temporary cerebral ischemia causes similar changes of cortical EPG and temperature with local acidity and resulting vasodilation. Respiratory anoxia produces parallel changes in arterial oxygen saturation and cortical EPG. The EPG falls to low levels first, after two minutes the EEG becomes equipotential with rapid S.P. negativity (7 millivolts) of cortex with respect to white matter.

Concussion causes immediate reversible cortical S.P. negativity (7 millivolts) indicating transient neuronal paralysis and an increase in cortical EPG oxygen due to neuronal paralysis and increased blood flow.

Contusion produces negative S.P. shifts arising from the damaged area of longer duration, complicated by local hypoxia and ischemia with further brain damage. Laceration results in widespread local hypoxia and ischemia due to bleeding and vascular spasm.

The initial effect of brain trauma is neuronal paralysis later complicated by ischemia and anoxia. In concussion, neuronal paralysis is the only effect.

Discussion

Dr. Walter Wegner: As indicated in the paper, the attempts to elucidate the mechanism of concussion have been many. Some bizarre proposals have been made to explain how the brain is injured. There is still much to be done. It is satisfying to find a piece of work of this sort which is well documented and convincingly presented to explain some of the mechanisms of concussion. The methods used have been very ingenious.

Dr. Robert S. Schwab: This method gives us many variables that would be difficult to get in human material. Have thresholds for evoked response been studied during concussion?

Dr. Peritz Scheinberg: If this method of measuring cerebral metabolism is satisfactory technically it may offer more than other methods in giving information about cerebral tissues. In Dr. Meyer's paper several things were of interest: Some findings represented an apparent contradiction to what we had learned by other procedures. Oxygen breathing in these animals resulted in considerable increase in oxygen availability in the tissues as measured by EPG. This change in oxygen availability was in direct proportion to alterations in blood pressure, which seems to be in contrast to what we understand about reactivity of cerebral vessels. Ordinarily, cerebral vessels respond to changes in blood pressure by regulating blood flow locally. This apparent contradiction made me wonder whether or not in these animals the anesthetic agent itself might not have resulted in some alteration in the physiological reactivity of the vessels which makes it difficult to know what would happen under normal circumstances.

Dr. John S. Meyer: I believe, Dr. Schwab, that Groat, Magoun, Dey and Windle showed that in either acceleration or compression concussion the cortical threshold of excitation (supranuclear pathways) was temporarily raised.

We have found that three or more minutes after an occipital lobe contusion the evoked response in the electrocorticogram can still be elicited.

I think we have many of the answers to the questions Dr. Scheinberg raised. I do not believe our findings contradict what has been learned from other procedures if it is recalled what we have been measuring. We measure the oxygen availability of tissues which may have differences from measurements of the cerebral blood oxygen composition. Oxygen breathing produces a more pronounced rise in the cerebral tissue space than in the arterial oxygen saturation. There is normally a close balance between neuronal consumption of oxygen and oxygen brought to the tissue by the vessels. When the blood oxygen is raised by breathing oxygen after air there is a large rise in the oxygen availability of the tissue space. This is a very consistent finding and a similar rise in oxygen tension has been shown by others to occur in the myocardium and skin with oxygen breathing. We now have considerable data showing that blood vessels may locally regulate their flow. Anesthesia appears to be an important factor in relation to minor compensatory mechanisms in the cerebral circulation following alterations in systemic blood pressure, but our findings of a critical level of blood pressure around 50–60 mm. of mercury below which cerebral blood flow begins to

fail has recently been confirmed in unanesthetized man by Moyer and others using the nitrous oxide method.

The changes in cortical EPG and temperature immediately after concussion are compatible with decreased neuronal consumption of oxygen (i.e. paralysis) later changes are due to increased cerebral blood flow. The same sequence occurs when the animal is concussed during artificial respiration.

The EPG measures cerebral tissue oxygen availability in small areas, this measurement may be influenced by: 1) changes in blood pressure and local blood flow; 2) oxygen saturation of blood; 3) neuronal consumption of oxygen. It, therefore, only measures local blood flow if the other parameters are constant.

TUSSIVE SYNCOPE. *Simon Horenstein, M.D.*

Tussive syncope results from critical fall in cerebral blood flow due to a combination of factors each of which in itself is not sufficient to cause an attack of unconsciousness. Of these reduced cardiac output consequent upon prolonged coughing is the most important. This alone rarely causes syncope, and further reduction in cerebral blood flow resulting from phenomena associated with abdominal ptosis, varicose veins, previous respiratory alkalosis or emphysema must occur in appropriate time relationship to cause a degree of cerebral anoxia sufficient to produce unconsciousness. The electroencephalographic abnormality characteristically associated with tussive syncope is marked by the development of widespread high amplitude slow activity most prominent in the frontal region which occurs with the start of the attack. This lasts only as long as the symptoms of syncope are present, and is independent of any other change which may have been present in the record previously. The usual clinical situation involves sudden rising from a chair or bed during a bout of prolonged coughing. This then is followed by syncope. There is no evidence that this disorder arises from purely cerebral causes, although in some cases there had been minor cerebral trauma. Treatment should be directed towards altering the phenomena which in any instance cause cerebral hypotension.

Discussion

Dr. Robert S. Schwab: How serious is this tussive syncope? I had a patient go into one while I was taking blood pressure. How dangerous is it?

Dr. Horenstein: Baker reviewed the literature in 1936. He recorded two instances of fatal tussive syncope out of 200 at that time. It was never clear from the clinical reports why these patients died. We have had difficulty getting clear EEG's, because the patients cough so much that the record is obscure or they cough so little that nothing happens. The easiest way to produce the EEG changes is to have them sit on a low foot stool, stimulate them to cough by putting a catheter into the throat, and encouraging them to stand at the height of the cough. The case reported by McCann in which syncope occurred when the bronchoscope was in the larynx demonstrated a very sharp increase in pulmonary artery pressure. It was thought upon that basis a factor in preventing returning blood to the left heart was a pulmonary artery spasm. Clinically a hard dry uninterrupted spell of coughing associated with some other phenomenon, e.g. rising from a chair is crucial. The element of pulmonary artery spasm is nuclear in such cases. Rise in spinal fluid pressure to levels of 780–800 mm H_2O is not regarded as a factor here.

Dr. John Meyer: We have made a few observations in experimental animals and have confirmed the mechanisms postulated by Dr. Horenstein. We have caused the Valsalva maneuver in monkeys recording cortical arterial and venous temperature, EPG, EEG and jugular venous pressure together with intrathoracic pressure, respirations and blood pressure.

Associated with sustained increase in intrathoracic pressure we have shown that there is a fall in cerebral blood flow and oxygen availability due to an increased cerebral venous pressure and a fall in blood pressure. The EEG activity is diminished in amplitude in this phase.

TIRESIAS SYNDROME—A CASE PRESENTATION. *Philip Solomon, M.D.*

An extraordinary case is presented in which an individual was changed in sex and then later was changed back again. The patient lived her first 13 years as a girl. At a southern state school for girls an anomaly of her genitals was discovered. She was sent to a large medical school hospital where she was operated upon several times, given testosterone and told she was now a boy. The patient spent the next 13 years in indifferent success as a male. Delinquency sent the patient to the state school for boys where the patient's large breasts caused a problem. A marriage was annulled after 4 years. Numerous failures and depression caused the patient to return to the medical school hospital where after months of psychotherapy and the administration of stilbestrol, she again resumed the role of a female. For the past 5 years she has lived a confused life colored by alcoholism and sexual relations with heterosexuals and homosexuals of both sexes.

The patient was admitted to the Boston City Hospital with pneumonia. Since her recovery she has been receiving psychotherapy in the Out-Patient Psychiatric Clinic and she has responded well.

A number of questions raised by a patient such as this are briefly discussed.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

Meeting of February 17, 1955

DR. WALTER WEGNER, President, *presiding*

PSYCHIATRIC TREATMENT AND SOCIAL STRUCTURE. *F. C. Redlich, M.D.*

This report is based on a study during the last four years by A. B. Hollingshead of the Department of Sociology and F. C. Redlich of the Department of Psychiatry of Yale University and their co-workers. Material was presented to demonstrate that differences in treatment from the first moment of contact between psychiatrist and patient are quite marked in the social classes. Referral, type of treatment, intensity of treatment, and methods of rehabilitation differ and seem to favor the upper classes. Actually such differences in treatment apply to most psychiatric disorders with the exception possibly of the treatment of manic-depressive patients. They are very striking in schizophrenia and in the psychoneurotic group. These differences in treatment were discussed in some detail and examples were cited which prove that they are not only due to economic differences, but seem to be conditioned in part by differences in communication and different value orientations of psychiatrists and patients. Communications between middle class psychiatrists and lower class patients seems to inhibit the therapeutic contact and process. This research at the moment is in a state of flux and the material is being analyzed to permit definite statements. The study, as it was presented, is a study of certain sociological aspects of psychiatric practice although some of the material will throw some important light on problems of psychopathology and psychodynamics.

Discussion

Dr. Joseph J. Foley: The decision about which class an individual falls into must be a difficult one. Could Dr. Redlich clarify the criteria by which he decided?

Dr. William Malamud: I was very much interested in Dr. Redlich's statement, particularly since I followed his work for sometime. For the sake of clarity, I think it would be well if Dr. Redlich would describe in more detail the classification that was established by Hollingshead, because any interpretation of the reasons for different distribution of neuroses and psychoses in these five groups would have to take into consideration basic principles which were used in developing the classification. I am quite certain that there are important socio-dynamic factors which contribute to this difference in distribution. It is also possible, however, that other factors come in which may be spurious. A number of workers in this area have found, for instance, that there is quite a tendency to make the diagnosis of neurosis more frequently in private hospitals than in other institutions. Where there is a question of a doubt, the tendency is to err on the side of a milder diagnosis with a better prognosis in the case of private patients. Another factor that may come in is that of the duration of hospitalization and an accumulation of the more chronic patients in places where less active treatment is being undertaken, and because of that, an artificial increase in proportion of patients suffering from serious illnesses in institutions where less active treatment is being conducted.

Finally, I would like to refer briefly to a statement that Dr. Redlich made, that in the case of indigent patients where the treatment is being carried out by younger members of the staff or even medical students, the results are less beneficial because these relatively inexperienced therapists lack the skill and interest that older physicians possess. I will agree with him in regard to skill, but I doubt whether there is less interest and enthusiasm on the part of the younger people.

Dr. Harry Solomon: There are at least a thousand questions that can be asked of Dr. Redlich about these findings, particularly as to his interpretations. I would like to say that this is a magnificent piece of work. It gives us all a chance to ask questions and debate. It is a method that is clear and obvious, and should have been done long ago. It has taken a certain amount of imagination to do the things that seem so necessary. What is highlighted is that a great portion of our community accumulate in large institutions where they get what Dr. Redlich calls custodial care. There they may deteriorate. Those who do not go through this oppressive control, tend to recover. I don't want to try to question this at this time; one possible explanation is that the majority of people with acute psychosis have in themselves the capacity to get well. Perhaps the treatment they get is more responsible for their long term process than the disease.

Dr. Alfred H. Stanton: Is it possible for your study to separate out variables so that one can tell *within* one ethnic group—Italian or Negro for instance—that the same relationship holds between social classes? Is this related to the ethnic group as a factor?

Because of the problems of understaffing of our mental hospitals there has been a tendency to rely upon exploiting the relationship of aide and patient for its possible therapeutic benefit; similarly the interrelationship between patients has been studied by group psychotherapy or patient government. It would seem from your work that these two approaches might have some unforeseen advantages in overcoming the difficulties which upper and middle class doctors might have in communicating with patients. Is that a fair implication?

Dr. Redlich: I appreciate this discussion. In answer to Dr. Foley, our criteria for the census study to determine social class are simple, based on Hollingshead's Index of Social Position: education, occupation, area of residence. Each can be clearly classified, scaled and indexed. It is different in each community. In our more intensive study we used other criteria, many that

are characteristic such as memberships in clubs, churches, patterns of recreations, etc. There are many variables of interest to the psychiatrist as to how people in various social classes live differently, how their aggressive and sexual and dependent behavior are different. For our criteria these three indices which determine social class were used. The reliability and validity from statistical controls is quite high. I wish that on the psychiatric side we had more criteria that are as clear as the sociologists have. They ask why our thinking is not as clear. The answer is, our problems are more complex.

Reliability of Diagnosis: It would seem that upper and middle class patients do get "milder" diagnoses from psychiatrists. I remember an instance earlier in my career in a private sanitarium in Europe. A patient from the high aristocracy had schizophrenia. The professor said: "This patient has a little thinking disturbance." I said: "It is schizophrenia." The professor said: "But you can't say this." In our study we talked to the psychiatrists, looked over the records, and made our own diagnosis. We tried to correct this as much as we could. We were also aware that neuroses may later turn out to be schizophrenia.

In answer to Dr. Stanton, I think he is right that on the basis of what we know, group therapy and something borrowed from play therapy may be proper forms of therapy among the lower classes. This might be difficult among members of the middle and upper classes who could not talk in a group as someone from the lower classes could do.

HIPPOCAMPAL STUDIES: THEIR POSSIBLE BEARING ON NEUROPSYCHIATRY. *Paul D. MacLean, M.D.*

Stimulation and electroencephalographic studies were reviewed that indicate role of hippocampus in regard to awareness, rage, pleasure, pain, and other emotions. Motion pictures were shown to illustrate alteration of conditioned avoidance behavior of cat (study with Dr. Janice Stevens) and monkey during hippocampal seizures induced by injection of crystalline carbachol into hippocampus. Emphasis was placed on the prolonged catatonic-like stances following excited, confused type of behavior in the test situation. The foregoing behavioral observations introduced the consideration of the effect of serpasil and other drugs on the electroencephalogram. Work in progress with Dr. C. Kim indicates that administration of Reserpine (serpasil) to cat may result in almost continuous regular activity at 3 to 4 per second in hippocampus during periods when neocortex shows desynchronized activity of waking state. Low voltage activity of same frequency as that in hippocampus may be recorded in region of hypothalamus. Studies with Drs. S. Flanigan and E. Gabrieli were described which suggest that metabolism of hippocampus might be differentially altered by pharmacologic agents. Administration of S^{35}-labeled methionine to rat results in particularly high radioactivity in cells of hippocampus. In general, depths of contrast seen in radioautographs of brain resemble Nissl-stained sections. In summary, accumulated findings were enumerated that clearly distinguish physiology of hippocampus from other cortical structures.

Discussion

Dr. Raymond D. Adams: I certainly enjoyed hearing Dr. MacLean. He has been very kind in coming to Boston to keep us posted on his activities. There can be no doubt in the minds of any of us of the importance of this part of the nervous system in the expression of emotion, and its probable role in diseases for which we have not a very good pathophysiology. What is the difference between what you consider to be the stimulation effect, or continued functional effect of the limbic system upon the animal, and the paralytic effect? Also your experiments would seem to give indication that there is some disturbance of awareness to environmental stimuli. How do you explain that phenomenon? Is there a loss of memory or capacity to acquire memory when the animal is in this stage as judged by your conditioning experiments? Or any others?

Dr. MacLean: When one stimulates a structure and can elicit time after time consistent motor responses, one never questions that one has obtained what Dr. Adams has referred to as a "stimulation effect." Such is generally the situation when one stimulates respective structures in the pyriform-amygdalar-hippocampal region where one elicits a wide assortment of viscerosomatic and affective responses. The situation is far different when one stimulates in one of the so-called "silent" areas of the brain. Except for the meager responses that have been described, the greater part of the hippocampus outside the amygdalar region is remarkably "silent" when the stimulus intensity is below threshold for inducing a hippocampal seizure. If a propagating hippocampal seizure is induced, however, the seizure has a tendency to spread in and be largely confined to limbic structures, and quite dramatic changes in the animal's behavior can be demonstrated. The assumption is that when seizure activity is present in a structure, it is incapable of integrating and acting upon the impulses that would normally be flowing into it. It is for this reason that the statement was made that a propagating hippocampal seizure results in what must amount *in part* to a functional ablation of the limbic system. It might be expected that a large functional ablation, like a large surgical ablation, would reveal behavioral deficits that otherwise might not be detected. One might think of the cerebral cortex as a little like a mirror. One must fracture a large part of a mirror before it becomes useless, say, for shaving.

Dr. Adams' question about memory is a most difficult one. The animals shown during hippocampal seizures appeared as though they had retained some recollection for the significance of the conditioned stimulus. We have not yet performed experiments to ascertain whether or not an animal can acquire memory for events occurring during a hippocampal seizure. Dr. Kubie suggests that memory depends on the integration of internally and externally derived experience. I have elsewhere raised the question of whether or not the experiences of a patient during psychomotor seizures are lost to recollection because the limbic discharges interfere particularly with the recording of internally derived impressions.

Dr. Robert S. Schwab: How long does it take for the hippocampal seizure to get to the other side?

Dr. MacLean: An afterdischarge induced in one hippocampus may be present for a variable time before spreading to the other hippocampus. Sometimes there seems to be an almost immediate spread; at other times, quite a latency. It is of interest that when respective limbic structures are activated by the local injection of cholinergic agents in solid form, the hippocampus may show almost continuous rhythmic activity at a frequency around four and a half per second.

Dr. Paul I. Yakovlev: Have you done any ablation experiments on the hippocampus?

Dr. MacLean: It is hard to do that without getting into a lot of other structures. Bard and Mountcastle have reported that bilateral ablations have resulted in enhanced pleasure reactions and increased placidity in cats—a finding that is particularly pertinent to this discussion in the light of the enhanced pleasure and grooming reactions we have seen when a drug-induced seizure of the hippocampus begins to abate or following a hippocampal afterdischarge elicited by electrical stimulation. Rats, by the way, show very intensive grooming activity following hippocampal seizures and occasionally there may be erections as they groom the region around the genitalia.

(Addendum: Pribram has found in monkeys that bilateral ablations of the hippocampus result in rapid extinction of postoperatively acquired conditioned avoidance.)

INTRA-ANEURYSMAL HEMODYNAMICS. *William J. German, M.D. and Samuel P. W. Black, M.D.*

A method has been developed for producing experimental "berry" aneurysms by grafting a vein-pouch upon an opening in the wall of the common carotid artery of dogs. As part of an investigation of stress-strain-time relations of aneurysmal rupture, the following factors have been studied: Comparison of intra-aneurysmal and intra-arterial pressures, jet action and turbulence.

The pressure within an aneurysm has the characteristics of side-pressure. Intra-aneurysmal pressure is very significantly increased by occlusion of the parent artery cephalad to the aneurysm and decreased by cardiac occlusion. Although all pressure elements are involved, the most marked changes are in pulse pressure. Intra-arterial pressure is slightly decreased cephalad to an aneurysm.

A jet of blood from a hole in the dome of an experimental aneurysm may attain a vertical height as great as 116 cm. and a calculated velocity as high as 447 cm. per sec. The dynamic force of these free jets averages about 20% greater than the static force equivalent of the pressure within the aneurysm.

Turbulence within an experimental aneurysm may produce a bruit. Cinefluroscopic observations indicate the presence of vortex motion within the aneurysms, irregular swirling, and retention of opacification beyond that of the peripheral artery. There is a peculiar cross-flow at the aneurysmal neck.

Discussion

Dr. Raymond D. Adams: Is there anything that would tell us why the proximal part of the neck is the soundest part of it? Why is there ischemia and degeneration of tissue distal to a ruptured aneurysm? Is the pressure distal to the aneurysm reduced long enough to cause an ischemic necrosis?

Dr. Joseph F. Foley: Are there any histological observations on the vessels after they have been sutured for a period of weeks or months particularly if there are changes in the wall of the grafted vein?

Dr. German: The problem in relation to the axis of flow remains unsolved. It seems that regardless of change of the angle of the aneurysm, as shown in the glass model as the clamps are taken off, the flow springs up to right angles to the parent vessel. Concerning the difference in hemodynamics depending on whether there is a branch nearby: We hope to put them onto a communication between the two carotid arteries. This would simulate the anterior communicating artery, an odd situation where the two pulses meet at that point. Ischemic necrosis distal to an aneurysm: I do not know that it can be answered from what we have. There is a tendency to loss of head distal to an aneurysm, due to the expansile nature of it, and tendency to turbulence, which will drop the pressure head in proportion to the square of the velocity. I would doubt they would be enough, because they operate with the aneurysm unruptured. Something else must happen at the site of the aneurysm. Histological changes: The aneurysms tend to have thick walls and simulate arteries. We have quite a number of aneurysms taken out; the older they get, the thicker the wall. Perhaps that is why the older aneurysms lose the tendency to absorb the thrust. Tendency to rupture at its dome I do not know the answer. One hydrodynamic fact: as the jet spurts into the neck, it is directed towards the dome. The force of the jet—as maximum when obstructed or interfered with; the jet would then assert its maximum effect at the dome.

BOOK NOTES AND REVIEWS

Books received are acknowledged and given a brief description in this section. Selections serving a variety of interests will be made from these for a more extensive review, as far as space will allow.

BOOK NOTES

Dax, E. Cunningham: EXPERIMENTAL STUDIES IN PSYCHIATRIC ART. [Philadelphia: J. B. Lippincott Co.: Pp. 100 with colored frontispiece, 51 plates and 7 figures. 1953].

The interest in the art productions of emotionally ill persons of all ages has spread rapidly during the past ten years in the United States where reports of diagnostic and therapeutic applications of this art are becoming quite numerous. Important informative contributions have been made also from other countries, particularly by British psychiatrists.

This recent book on the subject by Dr. Dax of Australia is an example of careful original studies, with conservative interpretations that are indicated in this field before art activities can be used to the best advantage as an aid to the evaluation and therapy of patients in psychological medicine.

What is most important, the discriminating reader may find scattered throughout the text comments that suggest additional research, as examples one might point out the desirability of studying a series of paintings or drawings before and after leucotomy on a number of patients. Another study might well be done on disturbances of the body image, since this subject is far from exhausted in terms of the art projection technique, and still another interesting problem would be a study of art productions of patients or other subjects while under the influence of the various hallucination producing drugs.

The illustrations as examples of patients' productions are excellent, there is a section on synesthesia with the method of studying it, and the bibliography is adequate. While small in size it is packed with valuable observations and comments that deserve a wide dissemination.

Morin, Georges. PHYSIOLOGIE DU SYSTEME NERVEUX CENTRAL: [Paris: Masson et Cie, Editeurs: 1955.]

This book which is intended to be exclusively didactic gives in a clear cut way the basic facts of the physiology of the central nervous system. Since it is written by a Professor of Physiology and deals with a number of animal experiments and human experiments, it is of only academic interest to the clinician, yet for a research worker on the central nervous system it might offer some interesting contributions and comparisons. It can very easily be read by those having a fair command of the French language. Its basic value is that of a textbook for the student of medicine in his pre-clinical years.

Laubenthal, F. LEITFADEN DER NEUROLOGIE (5th enlarged edition): [Stuttgart: Georg Thieme Verlag: Pp. 291—88 illustrations.]

This fifth issue of the author's well-known book of neurology has kept its clear cut partition of the discussed material. There have been added new chapters such as encephalography and parasitic diseases. Some additional knowledge has been incorporated from the advances in examination methods and in the realm of the infectious and virus diseases of the central nervous system. All in all it can be said that this book remains as one of the most concentrated and most valuable textbooks of neurology written in German. It should be within the reach of every physician because he is always sure to find useful diagnostic and therapeutic advice. To the English speaking physician who has a fair command of German, this book will be of interest because of its clear cut content and its well systematized presentation and thus will function as a book for quick reference.

O'Neill, Desmond (Editor), MODERN TRENDS IN PSYCHOSOMATIC MEDICINE: [New York,

Paul B. Hoeber, Inc. Pp. 384. Illustrated: 1955. Pr. $10.50.]

This book covers the subject of psychosomatic medicine in twenty one chapters written by numerous contributors who are specialists in comprehending body-mind relationships. On the whole the sections are very well done with each writer presenting his topic in an orderly, easily understood text.

The general practitioner will be served very well by the facts on etiology and treatment of the conditions that he encounters daily in his service among those patients suffering from stress disorders.

The first three chapters present different aspects of the psychosomatic concept and approach to medical problems. There are also three chapters devoted to pediatric disorders, and three to forms of therapy. The other sections deal with ulcerative colitis, skin diseases, obstetrics, hypertension, thyrotoxicosis, asthma and eye disorders among various other subjects of common occurrence.

A list of references follows each chapter and at the end of the book the classified bibliography should serve a useful purpose. The book will prove helpful to the doctors and the students who should fit themselves to recognize and treat both the person and the disease.

BOOK REVIEWS

Loepp, W. and Lorenz, R., RÖNTGENDIAGNOSTIK DES SCHADELS: [Stuttgart: Georg Thieme Verlag: Pp. 579-613: Illustrations. 1954, DM 97.]

The author gives an extensive basic introduction into the Roentgenologic aspects of the normal skull. Different chapters are devoted to malformations due to disturbances of growth, disturbances of the skull formation and generalized diseases such as reticuloendotheliosis, Niemann-Picks disease and parasitic infections of the brain. The benign and especially the malignant tumors are discussed impressively and are accompanied by some excellent illustrations. Skull fractures which often present diagnostic problems are outlined very well and with it the author gives a good technique for locating foreign bodies within the skull. A long chapter, more, for the oral surgeon and the dentist is devoted to the mandibula, maxilla and the teeth with all of their diseases, abnormalities, degenerations and tumors. A final chapter describes the technique of taking skull x-rays with all the provisions, to name only one, the demonstration of an interesting feature, the ductus nasolacrimalis.

All in all it can be said that to every branch of medicine the diagnostic evaluation of the skull is of utmost interest be it the infantile skull or the adult, be it the normal with its numerous variances or the pathologically altered skull. Infections, traumata, tumors and gene damages all leave their vestiges on the ossified skull. In this book all diagnostic points are given that are of practical interest. The author abstained from giving the use of contrast material since it is his opinion that the reader will recognize that adequate knowledge of the normal and pathological findings of the skull make the use of contrast dyes practically unnecessary.

This book will be of value to all physicians regardless of their specialty, even if they have only a small knowledge of German. The book is easy reading since the pictures are excellent and the titles are kept largely to Latin expressions.

WERNER T. KOENIG

Stourzh-Anderle, Helene, SEXUELLE KONSTITUTION, PSYCHOPATHIE, KRIMINALITÄT, GENIE. [Verlag f. medizin. Wissenschaften, pp. ix + 262. Vienna: W. Mandrich, 1955. $6.25.]

This is the first publication of a series, "Viennese contributions to sexology," published under the auspices of the Viennese Sexological Association. The author, a gynecologist and psychiatrist, compiled a vast array of observations, opinions, and generalizations concerning somatic constitution, perversions, psychopathy, criminality, and genius. Many artists, writers, philosophers, as well as psychiatrists and physiologists are quoted. The purpose was not to give a survey of statistical frequencies of various forms of sexual behavior or of possible causal connections, but to pre-

sent psychological and physiological theories which attempt to explain the origin of specific forms of sexual behavior and to describe life patterns correlated with different modes of sexual behavior. The reasoning is influenced by psychoanalysis, Freud and Jung. There is a definite tendency to combine analytic theories with biological processes (conception, gestation, child care, etc.), and their implications for family life and social organization. The book contains brief notices regarding the sexual life of about 120 geniuses. It appears from them that nearly all great men did their creative work while paying little sexual attention to women. The book is very readable, very informative, and contains many of the author's own comments. She takes an approving or critical attitude toward many a theory. Many readers will want to challenge some of the author's critical remarks; the latter, however, do not interfere with the author's presentation of the views of others. Stourzh has done a great deal of reading, summarizing, and thinking. Her book treats the related topics in a rather encyclopedic manner. It is an excellent survey of German literature in the field.

ZYGMUNT A. PIOTROWSKI

Freud, Sigmund, ON APHASIA. [New York, International Universities Press, Inc. 1953. xv, 105 p.]

This monograph, first published in 1891, is of value and significance in many respects. To the neurologist it offers not only historical interest, but stimulating ideas; many of the topical questions raised by Freud would constitute interesting projects in research today. In his attack upon the then current theories of aphasia, Freud drew a sharp line from Broca to Wernicke to Lichtheim and on down to Hughlings Jackson and Bastian, adroitly challenging the static-mechanistic concepts of the localization theory and substituting a new concept of the "speech apparatus" which owed its origin to Jackson's evolutionary orientation. In Freud's own words, "We set out with the intention of examining whether the principle of localization could really offer as much for the explanation of the aphasias as has been claimed, and whether one is justified in differentiating between centre and pathway of speech and between the respective types of speech disorders." With astute analyses of Wernicke's and Lichtheim's conduction aphasias, both of which he found inadequate, and through penetrating neuropathological work he was able to demonstrate that in all types of so-called subcortical and transcortical aphasia the lesions are situated in the cortex itself. And "the fact that cortical lesions of the same localization could cause such different clinical pictures called for an explanation." The ultimate conclusions concerning the disturbed functioning of the speech apparatus bear a striking resemblance to the formulation of Gestalt psychology as we know it today.

For the psychoanalytically oriented reader, also, the monograph has special interest. We are informed that the "speech apparatus" is the elder brother of the "psychic apparatus" which became the foundation of psychoanalysis. Other terms such as "projection," "representation," "cathexis" are now household words in psychiatry. It is clear that Freud was attracted to the topic of aphasia because the methodological problems presented were close in their structuring to the psychopathological problems already fermenting in Freud's mind. Freud was frank in acknowledging that Hughlings Jackson's genetic doctrine influenced his thinking, and thus is established a direct line of biological continuity from Darwin's evolutionary theories to the current ideas of psychoanalysis.

FRANCIS J. BRACELAND, M.D.

Kutush, Samuel B., and Gehl, Raymond H., THE GRAPHOMOTOR PROJECTION TECHNIQUE: CLINICAL USE AND STANDARDIZATION. [Springfield, Ill.: C. C. Thomas Publ., 1954. Pp. xi, 133]

This is a new psychological projection test, i.e., one in which the task given the subject is indefinite; therefore anything definite and meaningful in the subject's test reactions is his own spontaneous production. The graphomotor technique resembles the attempts at getting samples of automatic writing made about a half century ago when interest in hysterical dissociation was intense. During the Kutash-Gehl test, the subject is blindfolded, seated at a table with the elbows resting on it. A square piece of paper, 9″ by 9″, is placed before the patient, a pencil is put in his hand, and he is

told to "move the pencil freely on the paper but try not to make anything in particular. Just let your mind and your hand go freely". After five minutes, the paper is removed and another sheet of paper is substituted with the same directions. Before the blindfold is taken off, the subject is asked to tell what he has done on the first and second sheets. After the removal of the blindfold, the subject is asked to outline with the pencil all the objects or figures which he can see on his sheets through the onionskins placed on his original productions. All spontaneous verbal reactions, the answers to the examiner's questions and all free associations including observable motor reactions (tremor, hesitation, perspiration, etc.) are recorded on the test blank. The theory underlying the psychological significance of this new technique rests on some old and well tested graphological principles, on some psychoanalytic principles (effect of anxiety upon displacement, symbolic expressions, etc.), and the main statement that "the better adjusted the individual is and the less need he has to control his movements and thoughts, the easier and more pleasurable it will be for him to follow our 'fundamental rule'. The 'normal' should be able, therefore, to follow the directions without too much anxiety or discomfort and produce rhythmic, continuous, smooth movements covering a substantial portion of the page".

The test was tried out on 200 normal and 200 schizophrenic subjects. These two groups were well matched. The norms are given as guideposts to those who will want to try out this new test. There is also a history of graphomotor tests and a comparison is made among the varieties of motor tests. The unique features of the Kutash-Gehl technique is the elimination of visual stimuli and the absence of any definite task. The scoring scheme is well thought out, detailed, and can be applied with a high degree of reliability. The text contains 54 figures (reproductions of the subjects' drawings) which help greatly in making clear the difference between the normals and the schizophrenics. The great frequency of stereotyped and perseverating movements is perhaps the most striking aspect of the schizophrenics. The group differences between normals and schizophrenics are clearcut. Any type of reaction can be found in the schizophrenic production. The chief statistical difference is that the cases which deviated most markedly from the average, in either direction, are far more numerous among the schizophrenics than among the normals. The Kutash-Gehl book fulfills very well its purpose of a manual which can be used profitably even without an instructor. The book gives the new test a very good introduction into the family of projective personality methods.

Z. A. PIOTROWSKI

Shafer, G. Wilson, and Lazrus, Richard S., FUNDAMENTAL CONCEPTS IN CLINICAL PSYCHOLOGY. [New York: McGraw-Hill Book Company, Inc., 1952, pp. xi + 540, $6.00.]

The authors present in this book a methodical and quite inclusive study of the theoretical, methodological, and practical foundations for the broad and complex field of clinical psychology. Their wide experience equips them well for the project, and they prove their capability. As is noted in the preface, the average student makes his initial contact with clinical psychology with diverse backgrounds, few of which fit the novitiate for the most effective future progress. One of the most glaring weaknesses is the absence of an awareness of the total picture, a weakness, it might be noted, which is not restricted to the beginning student. The result, in many instances, is the development of a parochial attitude, rather than the catholic one so necessary. It is for such students and individuals that this book is primarily designed.

Representative chapters include "Historical Development", "Clinical Techniques", "The Nature of Personality", "Introduction to Therapy", and "The Clinician in Action". In these, as in the other chapter, the reader will find a generally competent and well balanced discussion of the particular topics. Frequent references are made to both authorities and specific studies, a practice which should serve to aid the student in integrating both his past and his present learning. As might be expected, certain of the opinions expressed and the statements made will be felt to be more or less controversial by some readers. This, however, would seem to "be in the nature of the beast", and it is highly doubtful that any book at-

tempting to cover the area encompassed by this could fail to precipitate at least some degree of argument.

The utility of the book is not limited to its use as a text, although it would appear to be appropriate for a seminar designed to give an over-view of clinical psychology. It should prove to be, in addition, valuable as a reference for brief and explicit discussions of a variety of relevant materials. In this respect, it would be expected to be valuable to those students interested in, and attempting to, organize much of the material which they have encountered, both in formal meetings and in less formal readings, into a coherent whole. The time and effort expended in reading and studying this book will be well repaid by a broader understanding of the background and the present status of clinical psychology.

BARTON W. KNAPP

BOOKS RECEIVED FOR REVIEW

June 1955

1. ABRAMSON, H. A. (Ed.) *Problems of Consciousness*, Transactions of the Fifth Conference—March 22, 23, and 24, 1954. The Josiah Macy, Jr. Foundation, Packanack Lake, N. J.
2. EATON, J. W. AND WEIL, R. J. *Culture and Mental Disorders*. The Free Press, Chicago, Ill.
3. OLIVEN, J. F. *Sexual Hygiene and Pathology*, J. B. Lippincott Co., Philadelphia, Pa.
4. SCHNEIDER, K. *Klinische Psychopathologie*. Georg Thieme Verlag, Herdweg, Stuttgart, Germany.
5. SLADE, P. *Child Drama*. Philosophical Library, Inc., New York, N. Y.
6. STRACHEY, J. (Editor and Translator) *Sigmund Freud, The Interpretation of Dreams*, Basic Books, Inc., New York, N. Y.
7. WILSON, J. T., FORD, C. S., SKINNER, B. F., GERGMANN, G., BEACH, F. A., AND PRIBRAM, K. *Current Trends in Psychology and the Behavioral Sciences*. Univ. of Pittsburg Press, Pittsburgh, Pa.
8. WYNDER, E. L. *The Biologic Effects of Tobacco*. Little, Brown, and Company, Boston, Mass.

NOTES AND NEWS

THE THIRD NEUROPSYCHIATRIC INSTITUTE

The Third Annual Psychiatric Institute will be held September 21, 1955, at the New Jersey Neuro-Psychiatric Institute, under the joint sponsorship of the New Jersey Neuro-Psychiatric Association and the New Jersey District Branch of the American Psychiatric Association.

The program will be devoted to Child Psychiatry. Speakers will include Dr. Frederick H. Allen, Dr. Francis J. Braceland, Dr. R. Finley Gayle, Jr., Dr. Othilda Krug, Dr. Fritz Redl, Joseph Reid, Dr. Eveoleen Rexford, and Dr. John Rose. Further information may be obtained from Dr. Robert S. Garber, Superintendent, New Jersey Neuro-Psychiatric Institute, Box 1000, Princeton, New Jersey.

THE NEW YORK ACADEMY GRADUATE FORTNIGHT

The New York Academy of Medicine will hold its Twenty-Eighth Annual Graduate Fortnight October 10–21, 1955, inclusive, on the subject *Problems of Aging*. The program will consist of 20 evening lectures and 4 evening panel meetings; 6 morning panel meetings; 19 afternoon hospital clinics; a Scientific Exhibit, and 5 Community Educational and Recreational Day Centers for the aged will hold open house.

Programs and registration cards may be obtained from

ROBERT L. CRAIG, M.D.
Secretary
Graduate Fortnight Committee

OCCUPATIONAL THERAPY CONVENTION

The 38th annual occupational therapy convention will be held in San Francisco, California, October 22–28th at the Sheraton-Palace Hotel. The theme of the convention is "Bridges to the Future". Outstanding leaders in various medical and allied fields will present current trends and problems in the fields of orthopedics, neurology and psychiatry as well as tuberculosis, geriatrics, and pediatrics.

Preceding the convention there will be a Workshop Institute (October 22–25) highlighting "The Patient's Point of View". A panel of speakers representing various social-medical-educational fields will open the meeting, followed by discussion workshops.

Any interested individual or group may obtain furthur program and convention information by writing to Northern California Occupational Therapy Association, 1680 Mission Street, San Francisco, California.

On May 18, 1955 the following members of the Illinois Psychiatric Society were elected to office for the coming year of 1955–56:

President, DR. ROY R. GRINKER, 4940 East End Ave., Chicago 15.

Vice-President, DR. GEORGE R. PERKINS, 6 North Michigan, Chicago 2.

Secretary-Treasurer, DR. SAMUEL BURACK, 737 North Michigan Blvd. Chicago 11.

Councilors, DR. PERCIVAL BAILEY, 912 South Wood Street, Chicago 12; DR. CHARLES B. CONGDON, 6 North Michigan, Chicago 2.

At the Eightieth Annual Meeting of the American Neurological Association held in Chicago from June 13–15, 1955 the following officers were elected:

President, DR. J. M. NIELSEN; *President-Elect*, DR. H. HOUSTON MERRITT; *1st Vice-President*, DR. JAMES W. KERNOHAN; *2nd Vice-President*, DR. ROBERT B. AIRD; *Secretary-Treasurer*, DR. CHARLES RUPP; *Assistant Secretary*, DR. WILLIAM F. CAVENESS.

At the annual meeting of the American Association of Neuropathologists held June 12 in Chicago, the following officers were elected for the year 1955–56.

President, DR. WEBB HAYMAKER; *Vice-President*, DR. BEN LICHTENSTEIN; *Secretary-Treasurer*, DR. LEON ROIZIN.

Doctor Robert Wartenberg, San Francisco, has been elected Honorary Member of the

Argentine Society of Neurology, Psychiatry and Neurosurgery.

62ND ANNUAL CONVENTION, ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

HOTEL STATLER, WASHINGTON, D. C.
November 7, 8 and 9, 1955

The Association is the only international society devoted to the military aspects of medicine, dentistry, nursing, veterinary medicine, and allied sciences. Noted speakers, appropriate ceremonies and a variety of entertainment will make this year's meeting attractive to attending members and guests alike. There will be an outstanding scientific program devoted to the latest advances and trends in the specialty of military medicine.

For the entertainment of the members and guests, a full schedule of events is being arranged. As in the past, one of the outstanding features is the Honors Night Dinner on November 9 at which the Sir Henry Wellcome Medal and Prize, the Gorgas Medal, the Stitt Award, the McLester Award, the Louis Livingston Seaman Prize, and the Founder's Medal will be presented.

NATIONAL INSTITUTE RESEARCH GRANTS

Twenty new research grants have been awarded by the National Institute of Mental Health upon recommendation of the National Advisory Mental Health Council at its March 1955 meeting. The total amount awarded in new grants was $282,724. The advisory Council at its March meeting also approved the continuation of forty-one research grants, amounting to $571,366. The favorable recommendation of the Advisory Council qualifies these frants for continued support by the National Institute of Mental Health.

A NEW PUBLICATION

THE INTERNATIONAL JOURNAL OF SOCIAL PSYCHIATRY

The First Quarterly Journal in this Field

AUTUMN ISSUE

This new Journal supports the correlation of interdisciplinary research. The second issue will include articles by:—

PROF. A. QUERIDO, *Amsterdam.*—Social Psychiatry and the Legal Issue.

DRS. ALEXANDER WOLF AND EMANUEL K. SCHWARTZ, *New York.*—The Psychoanalysis of Groups.

DR. T. M. LING, V. W. WILSON D.S.C. AND L. A. BRIGGS, *Sussex.*—An Investigation Into the Readjustment to Work of Psychiatric Cases.

DR. R. A. SANDISON, *Worcester.*—Group Psychotherapy in a Provincial Out-Patient Department.

PROF. KENNETH E. PRIESTLEY, *Hong Kong.*—Education and Mental Health in South East Asia.

DR. DORIS ODLUM, *London.*—The Integration of Psychiatry in General Medicine in Great Britain and Northern Ireland.

DR. GEOFFREY TOOTH, *London.*—Mental Health Services in England and Wales.

Subscriptions. Single copy—7s.6d $1.50
Four copies per year—£1.5s $5.

All enquiries should be addressed to:—

The Secretary, International Journal of Social Psychiatry

9 Fellows Road **London N. W. 3, England**

SYMPOSIUM ON

NEUROHUMORAL TRANSMISSION

Held by the Physiological Society of Philadelphia, Sept. 11 & 12, 1953

Appears in full in the March 1954 issue of

PHARMACOLOGICAL REVIEWS

Edited by Otto Krayer, with the assistance of George B. Koelle as guest editor. Among the authors are: Otto Loewi, Sir Henry H. Dale, U. S. von Euler, H. Blaschko, C. O. Hebb, E. J. Zaimis, W. D. M. Paton, G. Liljestrand, W. S. Feldberg, J. H. Burn, R. W. Gerard.

Original observations, criticisms, discussion of all aspects of the subject, with all their implications and ramifications. Articles grouped under such headings as: Epinephrine and norepinephrine; Acetylcholine and cholinesterases; Transmission and block at the motor endplate and in autonomic ganglia; The problem of transmission at chemoreceptors; Transmission in the central nervous system and sensory transmission; Local hormones. Vigorous discussion follows each topic.

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1. Noce, R. H., Williams, D. B., and Rapaport, W.: J.A.M.A. *156*:821 (Oct.) 1954.

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